JANUARY 10, 1953

Vol. 144—No. 2

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JAN 19 1953
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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

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L-to-R, J. J. McIntosh, General Mgr., Kenneth L. Henderson, General Plant Sup't., J. L. Trevillion, Kellogg Rep., inspecting Kellogg *Crossbar* installation at Forest City Exchange.

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FLASHES AND PLUGS

SOUND PSYCHOLOGY. On Dec. 21, Actor Ernest Truax appeared in a wistful TV play called "Mr. Quimby's Christmas Hats." He portrayed a well-meaning department store buyer who had a habit of over-purchasing stock goods.

He ordered 90,000 small, artificial Christmas trees, and when January arrived, the store manager didn't know what to do with the tremendous surplus.

The manager was furious, so Mr. Quimby suggested that the store feature the trees as a hat decoration. A hat so adorned would be called the "Love Hat," and was to be used only on those days when the wearer felt a definite surge of love for his fellowman. It worked, because onlookers seeing a sedate judge, or a racetrack tout wearing a hat with a jingling Christmas tree on top of it, smiled and laughed like they never had before, and sweetness and light crept into everybody's hearts.

The TELEPHONY-point of this story is that before the store executives appreciated Mr. Quimby's idea, and prior to the profits that came to their business in spite of the seasonal trees outliving their usual buying-time, two of the men sat in their plush offices, spluttering over what seemed to be a purchasing disaster.

They were men used to important appointments, urgent interviews, and hectic, busy days. As they pondered their problem, unhappy and harrassed, one finally said to the other: "Wait a minute, my telephone isn't ringing. I can't think!"

• • •

TOO TEMPTING. A real estate firm recently tried to make its display home, in a new subdivision, realistic by not only furnishing it throughout, but by adding even a telephone. Visitors poured through the house.

A little more than a month after the project opened, the real estate company received a $200 telephone bill. The visitors had used the "free" telephone to make calls all over the country.

• • •

OH, FAME, HOW FUTILE IS THY RING! Martin P. Durkin, who was named secretary of labor in the Eisenhower cabinet, returned to his home town, Chicago, recently for a 24-hour visit. But that meant little to a telephone operator.

Mr. Durkin was talking on the telephone when a newsman called his suite in the Palmer House. On another line, a hotel telephone operator commented on the fact that there had been many calls to the suite. She asked:

"Did he have an ad in the paper?"

• • •

NO TWO WAYS ABOUT IT. A Milwaukee (Wis.) secretary recently telephoned an air line office and said she wanted to cancel a plane reservation the sales manager had made for a flight to Grand Rapids, Mich.

"He was suddenly taken ill," the secretary explained, "and has had to go to the hospital."

"That's too bad," the air line girl said. "What about his return trip? Do you want that canceled, too?"

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January 10, 1953

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Published by
TELEPHONY PUBLISHING CORP.

Vol. 144, No. 2. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S. and Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries. Entered as second class matter at the Post Office at Chicago Ill., under the Act of March 3, 1879.

Telephone WA bash 2-2435
608 S. Dearborn St., Chicago (5), Ill.
U. S. A.

Locating Faults with Bridge and Ohmmeter

By DANIEL S. SEITZ
Plant Superintendent
York (Pa.) Telephone & Telegraph Co.

IT IS our purpose here to keep in mind the small telephone plant personnel and we shall attempt to provide information which we hope will be of benefit, especially to such persons.

In spite of the fact that the Wheatstone Bridge is one of the oldest and best instruments for use in locating faults in telephone cables, many Independent companies have not seen fit to use this valuable equipment—one reason perhaps, although not a good one, being the mistaken idea that the bridge is a complicated piece of equipment difficult to master by plant personnel.

The cost factor is also a poor reason for a company not owning at least one modern bridge. First, because it will give perfect service indefinitely without expense, except for an occasional battery renewal (usually three ordinary flash light cells), if given reasonable care and secondly, there are many uses throughout the plant for an accurate resistance measuring device.

At present prices, a high type instrument suitable for accurate resistance measurements, making Murray, Varley and other loop tests, costs approximately $200, including a carrying case which is essential for protecting the instrument while it is being transported from job to job.

The cost of the instrument may usually be saved by a reasonably few applications because of the time saved in locating the fault. It should be understood, however, that not every case of cable trouble can be located by the bridge method and, also, there is no other method suitable for locating every type of cable fault.

The specific use of the bridge will be discussed in detail later, but, first, we would like to illustrate the instrument by a simple diagram with the hope that those not yet familiar with its simplicity may become interested and eventually use it to advantage in locating cable faults for which the bridge is best adapted.

Bridge Circuit

The schematic diagram *(Fig. 1)* of a Wheatstone Bridge circuit is intentionally drawn in the form of a rectangle for clarity and ease of study.

This is an address presented by Mr. Seitz at the Plant Conference of the 1952 USITA convention.

With each of the four resistances being equal, it is obvious that the current flow would be equal in Paths No. 1 and No. 2. Therefore, no current would be flowing through the galvanometer and it would indicate zero as shown.

Now, if we vary any of the four resistances A, B, R, or X, the current flow in Paths No. 1 and No. 2 will become unequal and the galvanometer will indicate the fact by swinging away from zero.

In our next step, illustrated by *Fig. 2*, we have not changed the resistance of A and B, but we have connected a length of wire to the X terminals and arranged the R arm of the bridge so that its resistance values could be varied from zero to five ohms.

When the R arm contact was placed on the three-ohm setting, the galvanometer swing was toward the negative. Therefore, the R arm setting was too low. Moving the contact to "6" produced a positive swing indicating that the setting was taken too high. Finally, by placing the contact on "4" a balance of the galvanometer was obtained which means that the unknown resistance of the length of wire connected to X was equal to that in the R arm or four ohms.

Referring again to *Fig. 1*, we find a

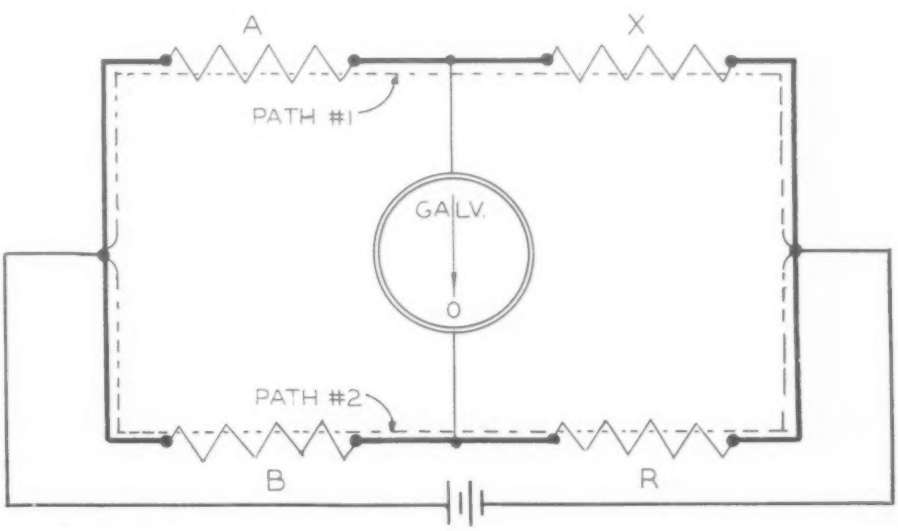


Fig. 1

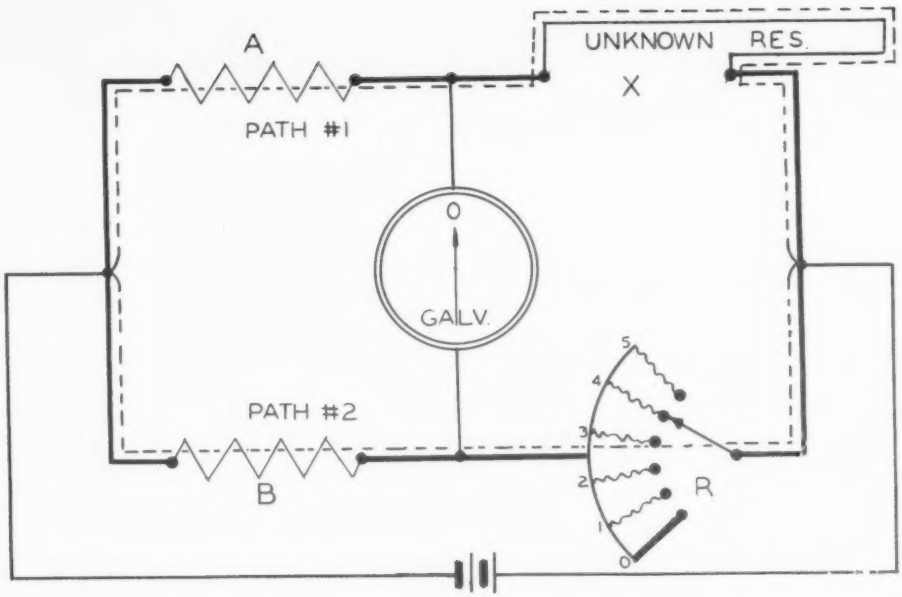


Fig. 2

total resistance in both Path No. 1 and Path No. 2 of two ohms, making the resistance of the paths equal.

Now the only difference in *Fig. 2* is that we have increased the total resistance in each path to five ohms by replacing the R and X values with four-ohm resistances. Therefore, B and R equal five ohms and A and X also equal five ohms.

The foregoing resistance measurement is perhaps the most simple one that can be made with a Wheatstone Bridge and is recommended for beginners as a first step in learning bridge methods and techniques.

When making general resistance measurements, both very low and very high resistances may be encountered requiring a sensitive instrument capable of covering a wide range of measurements and, in addition, it must also be accurate.

How this sensitivity, accuracy and range are obtained will be explained in the illustrations in *Fig. 3*, which show a complete bridge including adjustable A-B-R bridge arms, together with the galvanometer and associated shunt.

The sensitivity of the galvanometer should be controlled at the beginning of a test, especially when the approximate resistance to be measured is unknown. Begin by having the galvanometer shunt switch on the least sensitive setting, usually .001 or .01, whichever the bridge happens to be equipped with. This reduces the sensitivity of the galvanometer and protects it against excessive swing and possible damage to the pointer.

To begin the preliminary check measurements make "A" and "B" settings equal. For example: If the resistance to be measured is estimated to be in the order of hundreds of ohms,

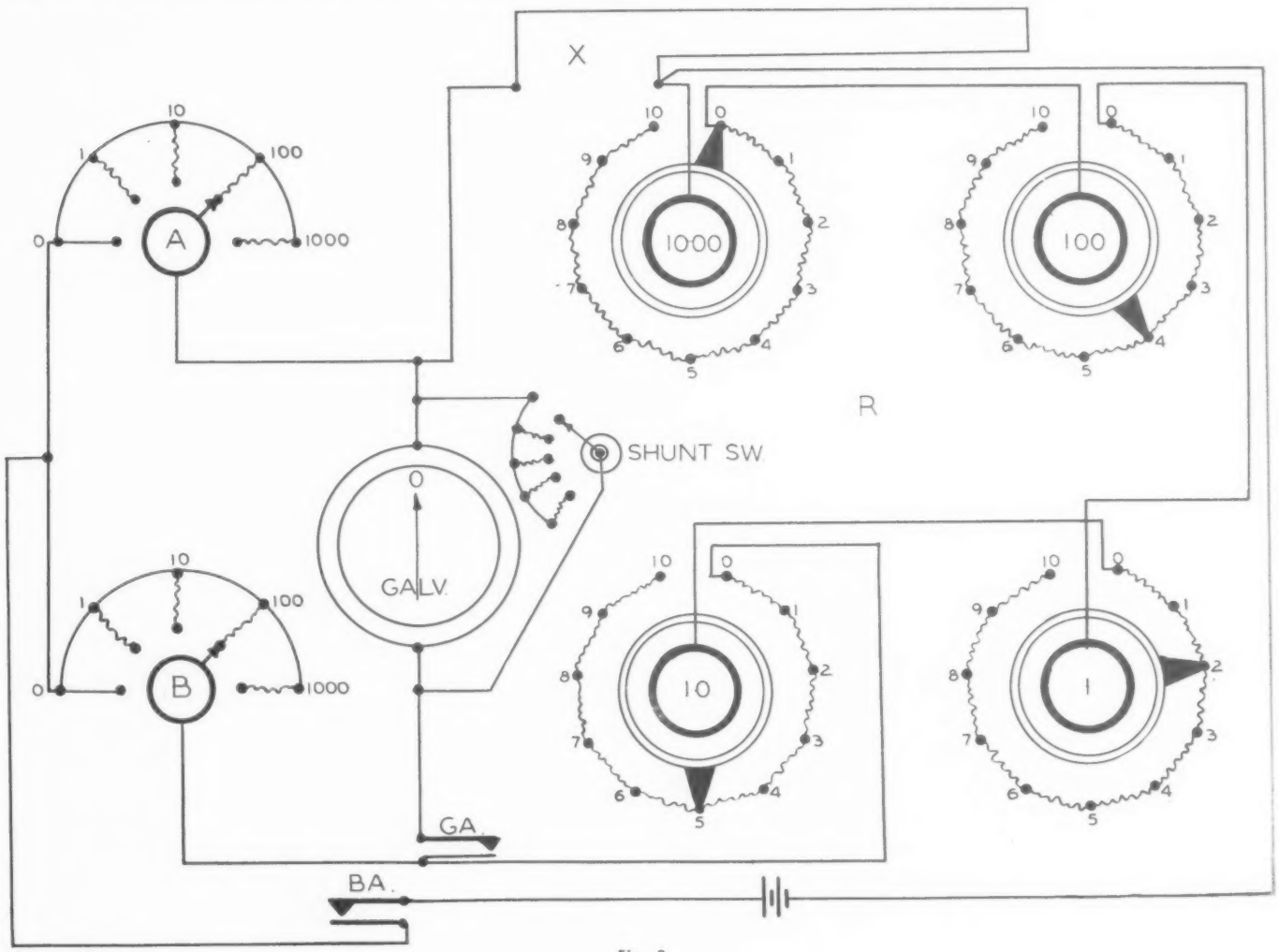


Fig. 3

set "A" on 100 and "B" on 100. Likewise, if the estimated resistance is in thousands of ohms, set "A" and "B" dials each on 1,000.

Let us now assume that the resistance to be measured is in the neighborhood of 400 or 500 ohms; then the "A" and "B" should be set on 100 and 100 respectively, the thousands dial on zero and the hundreds dial on 600; depress the galvanometer and battery keys. If the galvanometer pointer swings sharply toward +, reduce the setting to 500; if the galvanometer pointer again swings toward +, further reduce the setting to 400. Now, if the pointer swings toward —, it will indicate that the resistance being measured is between 400 and 500 ohms, therefore leave the setting at 400. If, in operating the tens dial in the same manner as the hundreds, we get at 50 a minus indication and a positive at 60, we leave the tens setting at 50. This means that our resistance has a value between 450 and 460 ohms. Finally, the units dial is moved until a balance is obtained at 2. No calculations are necessary now because the value of X or the resistance being measured is read directly from the dial settings of the R arm or 452 ohms.

During the balancing operation, as the galvanometer action becomes sluggish the shunt settings must be moved to a more sensitive setting. As the exact resistance setting is approached, this becomes increasingly important in order to obtain an accurate measurement. This very simple formula represents all the calculations required when making straight resistance measurements within the limits of the total values in the R arm. For example:

$$X = \frac{A}{B} R \quad \text{or} \quad X = A \div B \times R$$

Of course, the bridge is capable of measuring much higher and lower resistance values than those illustrated in *Fig. 3*.

Greater range and accuracy may be obtained by making the "A" and "B" arms unequal which we will explain by examples.

Dividing example—

Bridge settings A = 1, B = 1000, R = 150

$$X = \frac{A}{B} R \text{ or } 1 \div 1000 \times 150 = .15 \text{ ohms}$$

Multiplying example—

Bridge settings A = 1000, B = 100, R = 6155

$$X = \frac{A}{B} R \text{ or } 1000 \div 100 \times 6155 = 61550 \text{ ohms}$$

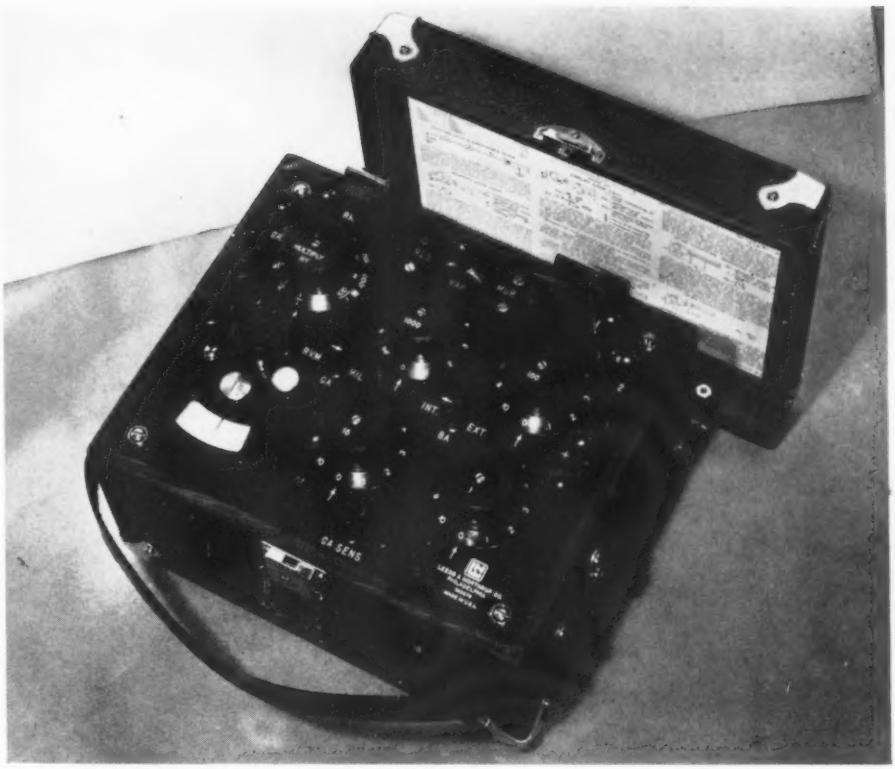


Fig. 4

By first making preliminary resistance measurements with the "A" and "B" arms equal, the approximate resistance to be measured may be determined quickly as a guide in selecting the proper "A" and "B" settings to obtain the greatest accuracy.

A table, usually attached to the bridge, should be consulted for the correct "A" and "B" settings according to the resistance being measured.

We have used for illustration a type bridge with the "A" and "B" arms each on a separate dial, first, because there are a great many such instruments still in use and, secondly, because of the fact that the component parts are arranged much the same as the schematic diagram of *Fig. 1* and should make for greater ease in study.

Several older forms of Wheatstone Bridges, including the slide wire and plug type, are now in use and giving good service on the jobs for which they were intended. However, the modern dial bridge has many advantages over these older types of instruments.

The Modern Bridge

The value of a good bridge for accurate resistance measurements in the telephone plant cannot be overemphasized, especially as it may be used for successfully locating cable faults.

Fig. 4 shows a modern bridge designed for making resistance measurements, also the Varley, Murray and Hilborn loop tests for locating telephone cable faults.

This modern instrument has a combined "A" and "B" arm dial which eliminates the need for selecting the proper "A" and "B" arm settings to obtain the greatest accuracy.

The multiplying dial has values of 1/1000, 1/100, 1/10, 1/9, 1/4, 1/1, 10/1, and 100/1 for resistance measurements and for Varley Loop tests; also settings of M 1000, M 100 and M 10 for ratios in Murray Loop tests. The deciding factor in locating any cable trouble is the resistance of the fault which largely determines the method best suited to do the job.

Unfortunately, certain methods become ineffective, although the fault resistance may be relatively low. It is possible with a modern bridge, having a sensitive galvanometer, to locate successfully faults with resistance values up to 50,000 ohms.

Analysis of Cable Faults

Because of the great variation in the nature of cable trouble, it is wise to thoroughly analyze each case before deciding upon the equipment and method to be employed.

It is a well known fact that solid shorts, crosses, or grounds are, in most instances, best located by the tone and exploring coil method; also certain wet trouble, if the fault resistance is not above a certain value, usually approximately 2,000 ohms. Under favorable conditions, faults having even higher resistances may sometimes be located by the change in tone volume at the fault.

Now, there is also a maximum fault

resistance, above which the cable flashing or welding of the cable pairs at the wet trouble location is not effective.

The application of high dc voltages to a cable may have the effect of drying out the moisture, especially if the moisture is not concentrated in a relatively small area of the cable. For example: A wet fault may extend several feet in either direction from the point where the water enters the cable and the resistance of the trouble may indicate that welding the wires at the fault should be successful. However, because of the distribution of the moisture along considerable length of the cable pairs, the applied current is likely to heat the wires in that area to a point where the moisture will be dried out, thereby increasing the fault resistance and preventing a breakdown of the insulation and a welding of the wires.

Another method of reducing the resistance of certain stubborn cases of wet trouble is to apply the central office 48-volt battery through a proper resistor to the affected pair or pairs, providing that the working lines can be shifted to other vacant pairs. Within time, under this method, electrolysis will reduce the fault resistance to a point where it may be located with one of the conventional methods.

The Ohmmeter

Regardless of what our pet method of clearing cable trouble may be, it will be found advantageous to use an Ohmmeter for analyzing the trouble resistance as a short, cross or ground, and then applying the most logical methods for making the actual location.

Much valuable time and expense can be saved by making a thorough analysis of the trouble before proceeding with any method of cable fault location.

The Ohmmeter should have a large scale which is easy to read, with the multipliers arranged so that all wet cable trouble resistance can be measured with reasonable accuracy.

It should be understood that the Ohmmeter is not intended for actual location measurements, but rather as a rapid means of determining resistances with reasonable accuracy.

When to Use the Bridge

We are here primarily interested in the "why, when and how" to successfully use the bridges as an adjunct for clearing telephone cable trouble.

Why—

(1) Because there are certain faults that cannot be cleared by any other means except, perhaps, by the cut and try method, long since obsolete and by far the most expensive in the long run.

(2) Because there is no danger to the operator as is the case when high voltages are used to break down insulation.

(3) Because no harm can be done to pairs which have low dielectric insulation.

(4) Because there will be no interference with adjacent pairs in the cable while tests are in progress.

(5) Because faults with resistances ranging from 0 to thousands of ohms may be located by the bridge method.

When—

(1) It is not practical or desirable to use a tone and exploring coil.

(2) It is undesirable or dangerous to apply high voltage direct current to the pair or pairs.

(3) The fault resistance is too high for location by the tone and exploring coil, or flashing methods.

How—

This brings us to the important part of this paper.

All telephone cable fault locations found by the bridge method are based on some particular form of loop tests, such as the Varley, Murray, Hilborn and several others, and each may have slight advantages under certain conditions. However, the Varley and Murray methods are in general use, with the Varley especially suited to longer cables, and the Murray best adapted for short measurements.

If we were limited to one simple method, we would choose the Varley because, in actual practice, nearly any case of cable trouble can be successfully located by application of the Varley method.

Bear in mind that several factors are common to the success or failure in all bridge location work.

One of these being that, in addition to the trouble wire, the clear wire *must be clear.*

Another is accuracy in reading the bridge and making the necessary calculations; also having available accurate cable plans showing length, taps, gauges, etc.

Our advice to the beginner in the use of a bridge is that he select good equipment and become thoroughly familiar with it before attempting to experiment with unfamiliar apparatus or devices.

(Please turn to page 38)

Fig. 5

by FRANCIS X. WELCH WASHINGTON EDITOR

Warns against efforts of anti-utility rate increase followers to get state legislatures to make regulatory laws more restrictive. Strong anti-utility line of case precedent set by Black-Douglas wing of Supreme Court, may force Congress to "slam doors" after federal court decisions. All eyes on REA telephone appropriation in budget.

GENERALLY overlooked in the excitement about changing administrations in Washington is the fact that this will also be a big year in the state capitals. It is the usual "big biennial" in which 44 state legislatures meet in regular session. Compared with the activity in utility laws of a decade or more ago—the 1953 sessions will not be too exciting, as far as the number of new laws actually passed are concerned.

But for the telephone industry, which will be engaged in a large number of 1953 rate cases, just as happened in 1952, close watch must be kept on attempts to change the rules in the middle of the game. By that is meant efforts of rate increase opponents to get restrictive laws passed against the utilities, after they have lost out in their efforts to block rate increases before the state public service commissions and the courts.

One such situation has already been reported from nearby Maryland. As a direct result of the 10 per cent rate increase ($450,000 as compared with the company's request of $2,300,000) granted to Chesapeake & Potomac Telephone Co., an advisory commission studying Maryland's public service law is holding a hearing this week on recommending more restrictive rate legislation.

(Incidentally, this writer wishes to correct a statement made in this department about the rate of return allowed in that case by the Maryland commission and upheld by the Maryland Court of Appeals. In the original copies of the court's opinion a clerical error gave the rate of return as 5.77 per cent. Subsequently, your correspondent received a corrected copy showing that the court had allowed Chesapeake & Potomac Telephone Co. of Baltimore a return of 5.96 per cent.)

The proposed law which the advisory commission is considering would make "original costs less depreciation" the absolute standard for establishing fair value of a utility property. It will be recalled that the Maryland commission recognized reproduction cost as well as original cost in determining the rate base for Chesapeake & Potomac. This commission ruling was upheld by both the lower and the higher Maryland courts. They said it was required under the Maryland law. A good many other states recognize reproduction cost in this manner. According to this writer's list, the state commissions of Arizona, Arkansas, Colorado, Georgia, Kansas, Maryland, Montana, Nebraska, North Carolina, Ohio, Pennsylvania, South Carolina, Virginia and West Virginia are among those which have considered other elements beside original costs in fixing a utility rate base.

Albert L. Sklar, chairman of the Maryland commission, admitted that the suggested legislation was an outgrowth of the Chesapeake & Potomac company case, even though the public service commission had allowed only a small amount above original cost, in finally arriving at a rate base.

Just what Sklar's commission will do on this proposal to spell out the original cost (and eliminate the reproduction cost) component in the Maryland utility rate base remains to be seen. The fact that it is an official group appointed by Governor McKeldin to revise the state regulatory law and recommend changes means that its recommendations will probably find some support when the state legislature meets this month.

This Maryland experience is only symptomatic of what may happen elsewhere. In Ohio—where the reproduction cost standard has long been mandatory by statute—a bill to change the rate base comes up pretty nearly every season. Therefore, public utilities of the states above enumerated would do well to watch the work of their legislatures, most of which assemble in January.

If proposals for changing the state laws come from the regulatory commissions themselves, they are entitled to a respectful hearing. After all, the commissions have to work with those laws. They should know best how well the present laws are operating, or if there is some defect to be remedied. But when such inspiration comes from *outside* sources, especially from those who have tried their case and lost it, and have exhausted every appeal to the highest courts of last resort, such a situation sounds like the old familiar attempt to change the ground rules because somebody lost a game.

If we were going through a period of *declining* prices, instead of rising prices, these same parties probably would not hesitate to ask that the rules be changed again, to reflect present "fair value." That's what happened in the celebrated railroad rate case of Smythe *v.* Ames back in 1898.

Watch Those Federal Courts

Speaking of court decisions, the U. S. Supreme Court got off an important railroad rate decision, late in December, which may have repercussions in the future on other forms of utility regulation. It was two days before Christmas when the Supreme Court upheld the federal government's power to *raise* railroad freight rates within the state of Florida to help make up losses on passenger services generally. (If that sounds good, don't forget that the power to raise rates means also the power to reduce rates.)

Justice Burton delivered the 6-to-3 decision. Justice Douglas wrote a dissenting opinion in which Chief Justice Vinson joined. Justice Black noted a dissent.

The decision applied specifically to an Interstate Commerce Commission

order increasing intrastate freight rates in Florida to correspond with increases ordered previously in *interstate* freight rates. The interstate increases reflected passenger revenue deficits in both intrastate and interstate operations.

The Florida Railroad & Public Utilities Commission appealed to the Supreme Court with a contention that the ICC: (1) Has no authority to increase freight rates generally so as to make up losses from passenger traffic, and (2) could not consider passenger deficits in attempting to fix *intrastate* freight rates.

The Interstate Commerce Act directs the ICC to raise intrastate freight rates if they cause unjust discrimination against interstate or foreign commerce. The ICC said the Florida *intrastate* freight rates were not contributing their fair share to enable carriers to give adequate *interstate* service and operate profitably.

Justice Douglas' dissent said that by its action the court "has taken an unprecedented and, in my view, an unwarranted step in enlarging the authority of the ICC." He called the action of the commission in the Florida case "a serious invasion of state sovereignty."

This decision is based on the ICC law, which is so specialized that it could never be applied to telephone rates. But the parallel is interesting from a broad constitutional viewpoint. Suppose the Federal Communications Commission—as the interstate regulator of telephone rates—ordered telephone companies to increase their *intrastate* toll rates so as to prevent a discrimination against *interstate* toll rates! That would be a parallel situation. So far, the economic trend in the telephone business has been in the other direction. The pressure has been on the FCC to *raise* the interstate telephone toll rates so as to ease the rate pressure on the users of intrastate telephone service. That is why the state commissions agitated and finally obtained the so-called "Charleston formula."

This brings up another new Washington development which is not getting the attention it deserves. That is the question of how the new Eisenhower administration and the new GOP Congress is going to get along with the federal judiciary, especially the U. S. Supreme Court.

For the past 20 years the federal judiciary has absorbed an overwhelming preponderance of Roosevelt-Truman appointments (somewhere between 80 and 90 per cent of all federal judges are Democrats). While we like to think of judicial decisions as based on abstract principle, experience insists that the composition of the court and the philisophy of its membership have an important bearing on final results in social-economic test cases. Thus, the Eisenhower administration will find itself confronted with a federal judiciary which might prove, on the balance, almost as critical of new federal policies and laws as the conservative judiciary which confronted Roosevelt's New Deal.

There is no reason to expect, of course, that Eisenhower would ever attempt to by-pass the courts, as Roosevelt did. But there will be some unwelcomed decisions and they may involve utility matters. Because of the time lag, difficulty along this line is not likely to reach the highest court in 1953. Just for a test example, watch, early in the year, for an important case now in the U. S. District Court for the District of Columbia, challenging the validity of super co-op loans by the Rural Electrification Administration. What will Justices Black, Douglas, Frankfurter, etc., think of a suit by 10 Missouri utility companies complaining about an REA loan which (they say) sets up a cooperative into competitive business operations, contrary to the intent of Congress? That is the test case likely to be decided at the district court level during the next month.

There will be other differences, arising under such laws as Taft-Hartley, the expected "tidelands" gas-oil bill, and other efforts of the states to get back control of their own resources, or the regulation of their own utility services (in contrast with federal domination). The point raised here is that, with a strong anti-utility line of case precedent established by the Black-Douglas wing of the Supreme Court, the new Congress may have to spend some time going around slamming doors after federal court decisions.

REA Telephone Loan Progress

How will REA make out on appropriations next year? Because of the holiday interruption of schedules, these lines had to be written several days before President Truman sent his new budget (for fiscal 1954) to the new Congress. There are already indications, however, that your correspondent's estimate last week—that it would come close to $80 billion—might be somewhat high. Regardless of that, the folks in the telephone industry will want to know just how REA will come out, in its new lending authority for the forthcoming fiscal year.

It must be recalled that the Eisenhower administration is pledged to strictest economy on the home front. This means that the new Congress will doubtless trim the Truman budget *whatever* it amounts to. So that if Truman asks for about the same amount in REA appropriations for next year, as he did for the fiscal (1953) year—through which we are now passing—REA may still come out with less money to spend.

We won't know, finally, until some day next May or June when appropriations bills generally get acted upon. But general expectations seem to be that the new Congress will make at least a 10 per cent across-the-board reduction over the present (fiscal) year's appropriations for spending and lending agencies. Across-the-board cuts are politically easier to associate with campaign pledges for thrift, than the pick-and-choose economies which usually run into congressional log-rolling.

One thing seems sure, and that seems to be that by the end of this fiscal year (June 30, 1953) REA will have allocated an amount equal to the total lending authority allotted to it by Congress, including the "contingency" funds which the Secretary of Agriculture was authorized to call upon "if needed." This is mentioned because of a contrary impression reported in this department several weeks ago based on observations by Representative Taber (R., N. Y.).

During the calendar year 1952, REA had approved loans for rural telephones, amounting to almost as much as the combined total during the two previous years. Incomplete but approximate figures given to this writer, as of the end of 1952, show that REA has allocated $106,000,000 in approved rural telephone loans. This compares with $54,000,000 in approved loans as of the end of 1951.

It is important to remember, of course, that REA's approval of the loan is not the same as handing out the money. Funds totalling $17,000,000 had actually been advanced on construction completed as of the end of 1952. The number of REA-financed systems put into operation as of the year end, amounted to 17. These operate in 13 states.

Considering the fact that REA rural electrification distribution loans are entering their final phase, the emphasis is likely to turn more and more to telephone loans. For this reason, whatever new lending authority Congress may see fit to give REA, as a whole, the rural telephone part of the business is likely to get a bigger slice of the pie than in previous years.

Possible congressional economy to one side, one other cloud appears on an otherwise fairly bright REA horizon. That is the possibility of over-all reorganization of the Agriculture Department. REA activity has not been

(Please turn to page 40)

Downdraft from helicopter's rotor creates 30-mile-per-hour winds, sufficient to whisk porous ice and frost from open wires.

'WHIRLYBIRDS'

Clear Ice from Toll Lines

HELICOPTERS performed a first in telephone toll maintenance in The Pacific Telephone & Telegraph Co.'s Washington area on Nov. 22 to 26, when freezing fog blanketed the entire eastern half of the state.

Moisture settling on the toll lines and freezing resulted in a build-up of frost as much as 2 inches thick. The frost was porous, but its continued accumulation threatened to snap open wire lines.

The low fog-frost condition also caused increased attenuation that interrupted the broad band channel systems on the Pasco-Spokane, Pasco-Walla Walla, and Pasco-Yakima open wire leads. Affected were 13 JK or JL carrier systems, 5C systems, and a Lenkurt system between Pasco and Othello, representing 267 toll message circuits and 15 private lines.

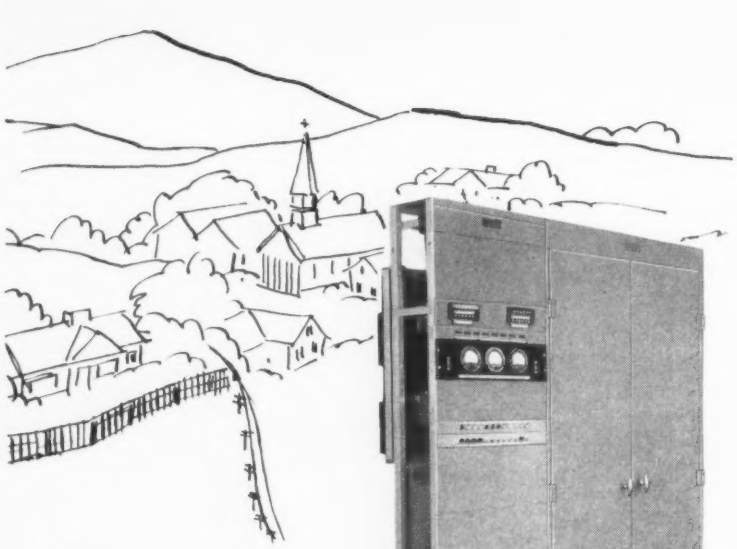
By Monday, Nov. 24, eastern Washington plant people faced one of the most serious situations of recent years. The loss of carrier frequencies on one main line could be met by rerouting but in this case all three key lines were severely affected. Long distance telephone calls between eastern Washington and the coast at Seattle and Portland were being delayed several hours. Some 700 miles of telephone lines were affected over two-thirds of the state. Altogether more than 100,000 circuit miles were affected.

By Monday morning all available maintenance people and a large number of construction employes were out on the job. Crews were going along toll lines, beating them with bamboo poles to knock off the frost. It was a losing battle. There weren't enough men to cover the hundreds of miles of telephone lines involved in the three main toll leads of eastern Washington. In addition, the condition of fog and cold continued with the result that lines were covered again with frost in 24 hours.

The helicopter idea originated in the Yakima toll testroom with Chalmers McWhorter, chief testboardman, Keith Newlun and Paul Broten, telegraph repeatermen and Charles Miles, testboardman. The men had all watched while a helicopter had sprayed Yakima orchards. Chalmers McWhorter knew the helicopter pilot. Why couldn't the helicopter be used to free the lines of frost? The idea was passed on to the division headquarters people at Spokane. Spokane plant people decided to investigate the possibilities further. Meanwhile, without notifying the company, the helicopter pilot, who had been asked for his opinions, made a test run along toll lines south of Yakima. He reported good results. It took a few hours to make satisfactory arrangements. Adequate insurance and all other details were finally worked out with the Economy Pest Control Co., owner of the helicopter service at Yakima.

The helicopter began operations on Nov. 25 over the most critical toll line section between Pasco and Yakima. If the lines in that section could be freed of frost, a calling route could be established to the coast over the Yakima-Seattle coaxial cable buried underground, and weatherproof. The Yakima supervising wire chief, W. B. Martin, and James Hines, supervising construction foreman, rode along the route of

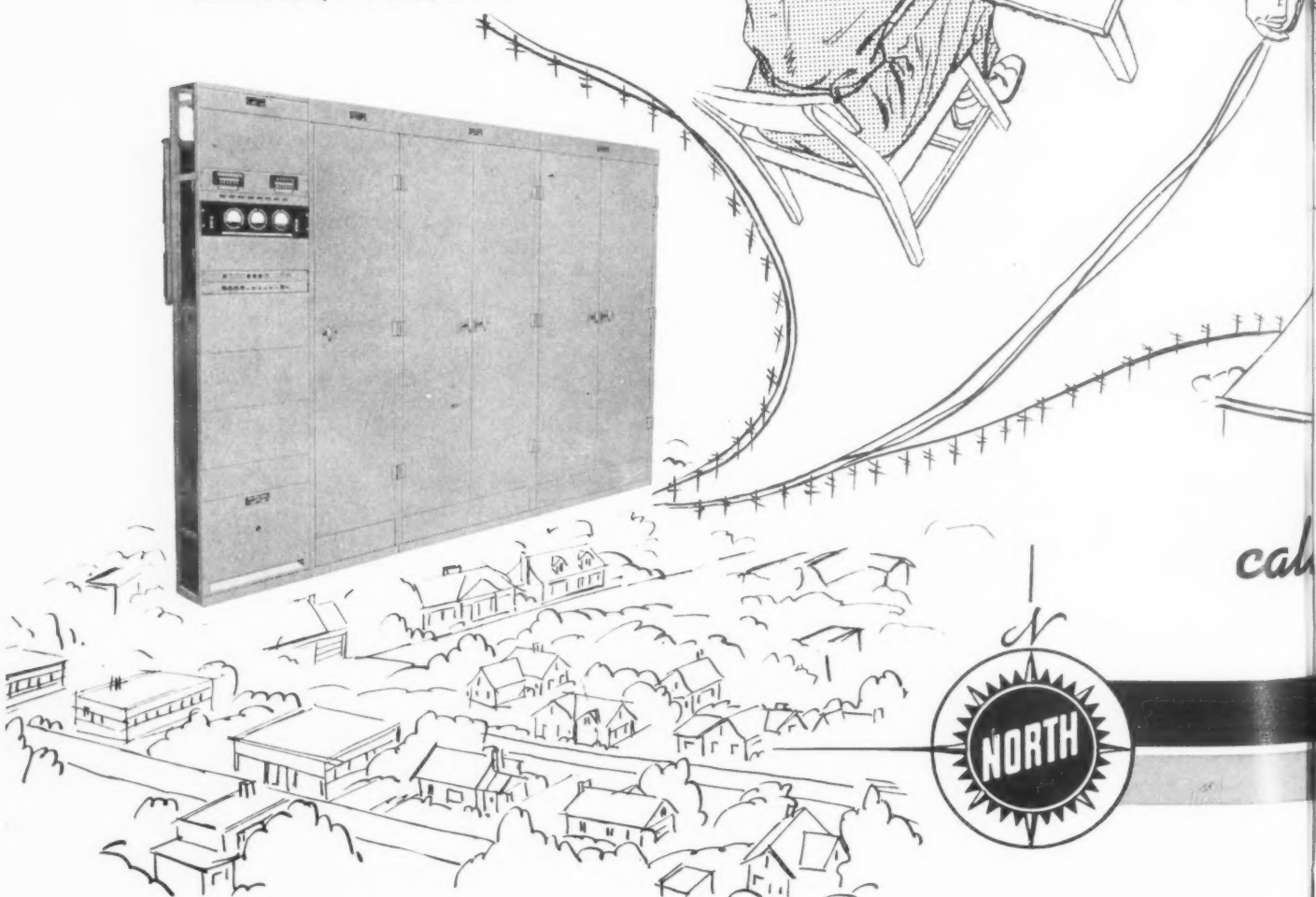
(Please turn to page 22)



You can start in a small community with 10 lines, in a NORTH CX 10, with up to 30 lines in a CX 30, as shown at right, or up to 60 lines in a CX 60. For *Planned* Expansion larger exchanges are recommended.

GUIDEDP

For growing centers; a NORTH CX 200 (as below) or a CX 1000 partially or fully equipped as needed. Other NORTH systems to 10,000 lines.

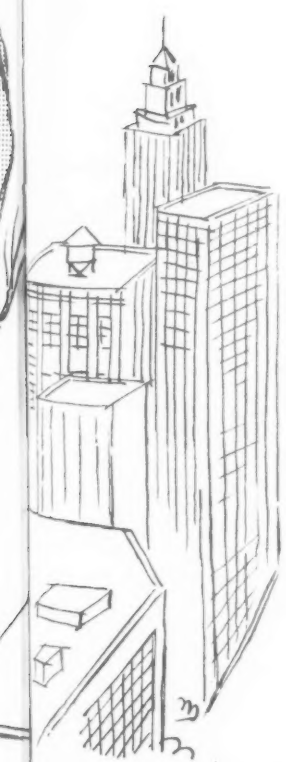


NORTH

Protect Community Progress,

Subscriber Satisfaction, Profits, with

PLANNING . . .

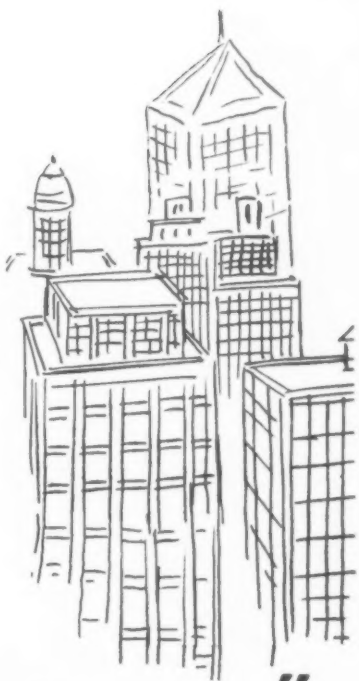


Independent Telephone Companies provide the vital nerve system of communities which make up the backbone of our nation. It is, then, a matter beyond selfish interest for each company to pace its community's growth with adequate expansion of communications.

There should be no obstacle to this, restrictions and allocations notwithstanding, IF there is co-ordinated planning. As we have said before, if every Independent Company would take a tip from the "Big System" and sit down with its equipment supplier, far in advance of pressing need, to discuss plans for progress, future expansions would profit greatly. Companies which follow this policy with North take advantage of a vast store of experience in the logistics of plant-to-population programming. They profit by a superior brand of telephone engineering. They secure sound guidance in planning for their own communities' needs.

At the same time, production plans, on a long range, can be scheduled to the needs of the industry, as prudent travelers might synchronize their watches.

Speaking for steady progress, we would say — Set your planning sights years ahead, — count the steps you must take to achieve the ultimate, then, before your estimates become "immediates"



NORTH *for "Expansion Insurance"*

THE NORTH ELECTRIC MANUFACTURING COMPANY

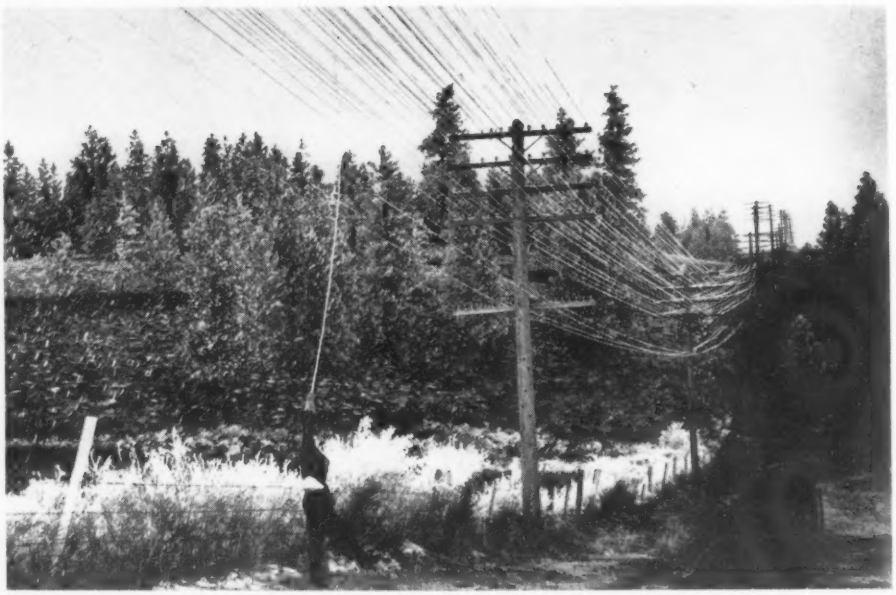
Originators of ***ALL RELAY*** *Systems of Automatic Switching*

610 South Market Street, Galion, Ohio, U. S. A.

the toll line to direct and signal instructions to the flyer. They found that they got the best results when the pilot flew alongside the lines at about 10 to 15 feet above them. This provided a down-draft of winds of about 30 miles per hour which vibrated the lines, freeing them of the frost. Within two hours the readings on the indicators in the Yakima and Pasco toll testrooms showed that "carrier" channels were being recovered. By evening the majority of the circuits between Pasco and Yakima were back in service.

For several days, crews had been beating the lines from Pasco to Spoane with only moderate success and on Nov. 26 the helicopter was dispatched to work that route. On Thanksgiving Day the helicopter kept at work on the Pasco-Spokane lines and after the stretch of lines between Sprague and Cheney was covered, most Pasco-Spokane carrier circuits were restored. The main long distance route between eastern Washington and Portland, Oregon, is a line between Yakima and The Dalles, Ore. It is extremely rugged country and about 20 men had been removing frost from the wires with poles but the manual operation couldn't do as complete a job as was being done with the helicopter. The wind created by the rotors not only removed frost from the lines but also from the telephone crossarms, and other fixtures.

By noon Wednesday (Nov. 26), arrangements had been made with the Economy Pest Control Co. to use another helicopter it had leased. This second plane was dispatched to the Yakima-The Dalles section about noon on Wednesday, but that first afternoon's work didn't seem to accomplish much. Thursday the helicopter patrolled a 35-mile section of that line between Goldendale and the Columbia River and Friday morning results became apparent with the regaining of most circuits to Portland.



Men wielding bamboo fishing poles couldn't keep up with the frost and ice formed on Pacific T&T's open wire leads by the combination of low fog and 18 to 20 degree temperatures in eastern Washington. Station Repairman Vernon Christianson is working along the Spokane-Colfax toll lead about 10 miles south of Spokane.

Although weather conditions had only abated slightly, calls were going through quickly by Friday afternoon. More frost trouble was expected but the use of the helicopter in remote sections and manpower in other sections is expected to keep the situation under control.

Eastern Washington plant people expect to call helicopters into use immediately if such extensive frost conditions develop again. Use of the helicopters seems to have proven both an economic and practical method in meeting such widespread troubles.

For decades old man winter's frost and ice have played havoc with outside lines in the inland portion of Washington and Oregon. Keeping calls going through in winter has been a 24-hour job for hundreds of plant men in those districts. The "Whirlybird" might never have been tried if four Yakima men hadn't been interested enough in the company's problem to send along an idea. That idea, to the long distance user, means speedier restoration of circuits should similar frost conditions strike again. To plant people it means saving many long miles of walking and beating bamboo poles on the wires.

Freedom from Government

The *Saturday Evening Post* recently ran an editorial called "The America We Lost," by Dr. Mario A. Pei, who emigrated to this country from Italy in 1908 and is now an associate professor of Romance Philology at Columbia University.

Dr. Pei's theme is one that should be pondered by every American who loves this country, its traditions, and what it has stood for. He writes, "When I first came to America, 44 years ago, I learned a new meaning of the word 'liberty'—freedom from government." He had come from a country which was dominated by an octopus-like bureaucracy. The simplest activity resulted in government intervention. In his words, "America in those days made you open your lungs wide and inhale great gulps of freedom-laden air, for here was one additional freedom —freedom from government."

This, Dr. Pei finds with sorrow, is the America we have lost. To quote him: "Foreign-born citizens have been watching with alarm the gradual Europeanization of America over the past 20 years. They have seen the growth of the familiar European-style government octopus, along with the vanishing American spirit of freedom and opportunity and its replacement by a breathless search for 'security' that is doomed to defeat in advance in a world where nothing, not even life itself, is secure.

"Far more than the native-born, they are in a position to make comparisons. They see that America is fast becoming a 19th-century-model European country. They are asked to believe that this is progress. But they know from bitter experience that it just isn't so."

The OPERATOR'S CORNER

by MAYME WORKMAN, Traffic Editor

OUR POINT OF VIEW is most important, on the job as well as in our personal lives. The impression of so many things we think about in this world depends so much on the point of view; and because of that, too frequently we become impressed with a thought about a subject which may be entirely erroneous. Sometimes our idea of a thing becomes so firmly embedded in our systems that it is almost impossible to eradicate it, even though a careful analysis indicates that our idea is wrong.

There are many tasks to be performed in the central office, tasks which may be a pleasure, or otherwise, depending upon our point of view.

It is probably true that a great majority of people regard a duty as an unpleasant task. Because the word "duty" has been so constantly associated with this unpleasant thought, the mere mention of the word, or the act which goes with it, creates a disagreeable feeling in the mind. Mention the word "duty" and immediately some people sort of rebel.

After all, isn't it a fact that every duty is a privilege, if we would but think so? By our discolored thought, we camouflage a privilege; in our mind's eye the true fact becomes concealed or distorted, and instead of seeing a privilege or a pleasure, we only vision what seems to be something disagreeable.

A duty implies a worthwhile thing to do, and surely it is a privilege to be permitted to perform a worthwhile act. Duty implies a service to someone else, or some worthy cause; then it must be true that it should be a source of satisfaction or pleasure to render such service, although it may be considered a duty.

An operator may recognize it is her duty to report for work at the scheduled hour, at 7 a.m., for example. She may be irked at the thought of arising in time to report for duty at the prescribed hour. On the other hand, if she approaches her task with the thought that it is her privilege to relieve an operator who has been on duty all night, an operator who is weary and ready for her rest, the duty becomes a pleasure and a privilege.

Telephone folk believe in service. They believe that it not only yields profit, but pleasure as well. Service is nothing more nor less than the performance of a duty. Duty is the good act that needs doing—service is the completed act—so that to all intents and purposes they are synonymous.

Operators know that service is a privilege, that it brings both pleasure and profit. They are in a position to practice this philosophy every day during their hours of duty. Would it not therefore be the part of wisdom to think of duty as being a blessing and privilege?

As we think of duty from this sensible point of view, it might be well to think of our duty as individual operators, supervisors or chief operators. We all owe a duty to our company and the people we serve. So, let us think correctly, and recognize the truth that this duty is a privilege, and in the performance of our duty, and in the exercising of the corresponding privilege, we will surely get a full measure of profit and pleasure in return.

Every individual has a duty to perform—the postman brings our mail, the cleaner delivers our garments, the milkman delivers our milk, and so on. If we are observing, we can readily recognize the individuals who are thinking correctly in performing their tasks. Take our paper carrier for example. On rainy mornings our paper is always carefully folded and placed near the door to protect it from the rain. This boy is performing a service and he is well thought of by each of his customers. In fact, we hope he will serve us for many months to come.

An operator who gives subsequent rings on a connection because she feels it is her duty to do so is quite different in her manner of thinking than the operator who makes the subsequent rings because she is anxious to have the desired number answer, to enable the calling party to carry on the conversation he desires.

A supervisor who instructs an operator because "it is part of her job," is not deriving the same pleasure from this task as the supervisor who is eager to have her student thoroughly understand the instruction she is giving so that she may develop the desired efficiency in her work.

A chief operator who gives her attention to an operator who has a personal problem because she has been told "this is the thing to do," will not derive the satisfaction from the contact that can be obtained by having a sincere desire to be helpful and making this desire apparent by her kind and sympathetic attitude.

We are not selling milk, newspapers, or one of many other commodities. We are selling the thing we have been speaking of—service. So we, of all people, should think correctly and have the proper attitude toward our duty as traffic employes. Having this attitude, we shall be able to enjoy in full measure the privilege we enjoy in rendering service to our customers—service of a quality that enables the customer to know we consider it a privilege to serve him.

Traffic Questions

(1) If the calling party volunteers routing directions, should they be entered on the toll ticket?

(2) In recording a long distance call, if your position information indicates that numbers in the called place consist of a different number of digits than given by the calling party, should you give the calling party the correct number of digits if you know it?

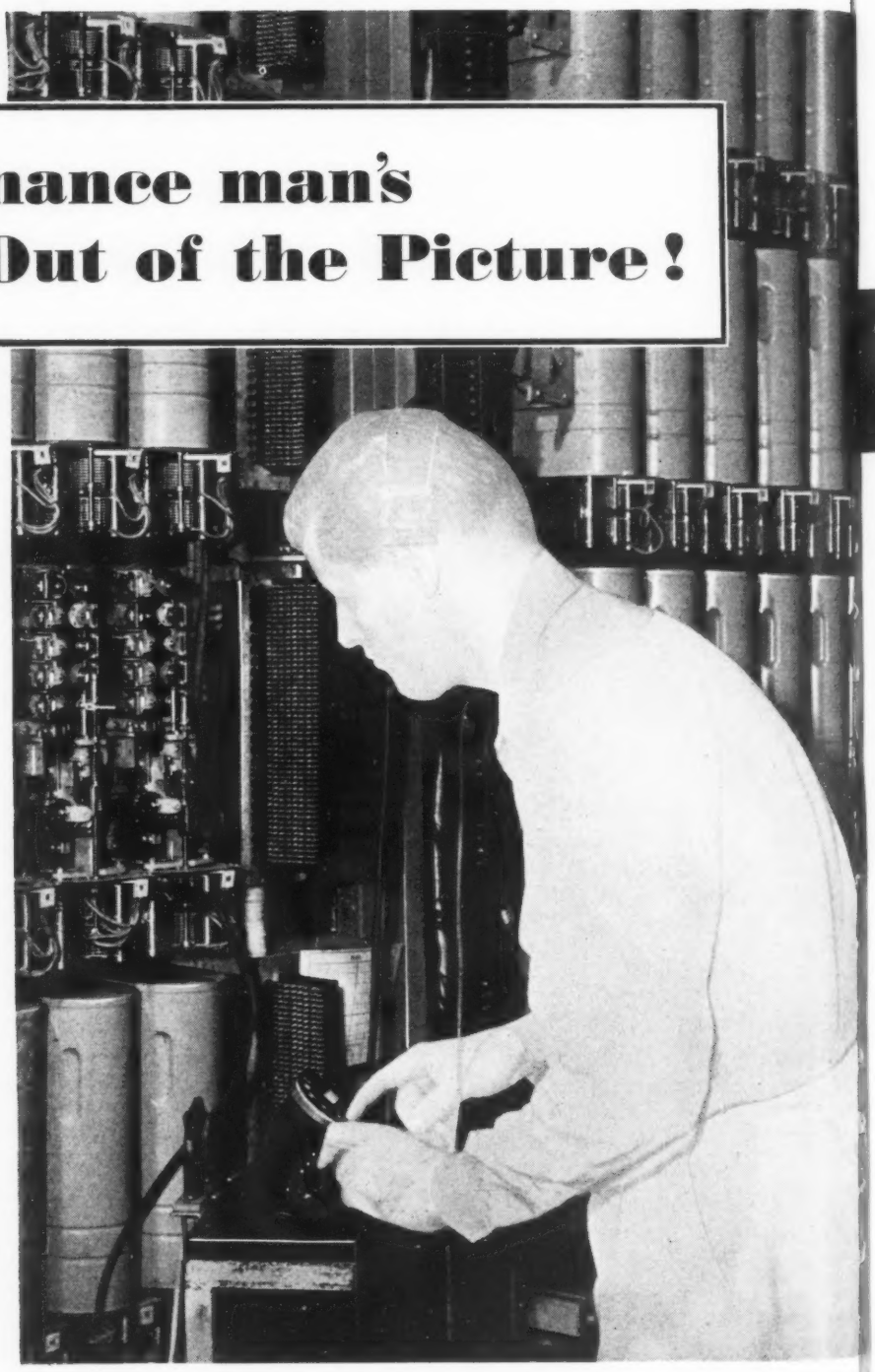
(3) How should the operator proceed upon a request to talk from another telephone and to charge the call to that telephone?

(4) In placing a long distance call, if the calling party asks to be notified after he has talked a stated period, how should the operator acknowledge the request?

(5) At what point should the filing time be entered on the ticket?

Answers are presented on page 40.

The Maintenance man's practically Out of the Picture!



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You'll see why Strowger Automatic puts the maintenance man
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telephony's *SAFETY* bulletins

No. 30—The telephone business has earned first place for Safety among the nation's industries, but telephone men still are getting killed. Every unit in the industry must get together to make telephone work safer.

by FRANK E. LEE

SAFETY is a mundane thing. It's like telling a bird how to fly. . . . Or a fish how to swim. . . . Yes, it's generally for the other fellow but not us, because we know all the answers. But do we? Are we doing the very best safety job we can?

Mr. Cable Splicer, how careful are you about protecting that open manhole with flags, barriers, and flares? Have you posted your warning signals far enough up the street to give every motorist a chance to be careful—for *your* sake?

Mr. President, are you positive your men are working with safety along those wooded lanes in the country, as well as on the main street in town? Have your men been impressed with the need of working safely on the little easy jobs as well as the big hard ones?

I could ask many questions like this, but maybe it would be better to stimulate your thinking with cold hard facts. In presenting these facts, TELEPHONY is placing a challenge squarely before every person in the far-flung telephone industry.

Fact No. 1 is the safety record of the telephone industry.

For a number of years the telephone industry has earned first place among the industries of the nation for the lowest number of fatal accidents per thousand employes. This is a noteworthy achievement—and didn't just happen. Many days and years of earnest effort by a whole host of telephone people have made such a record possible. The praise and recognition that go with the safety record earned by the industry should not go alone to the folks in the front office, although they have certainly earned their share. It doesn't belong entirely to the large organizations in big cities, either, although they, too, earn their share.

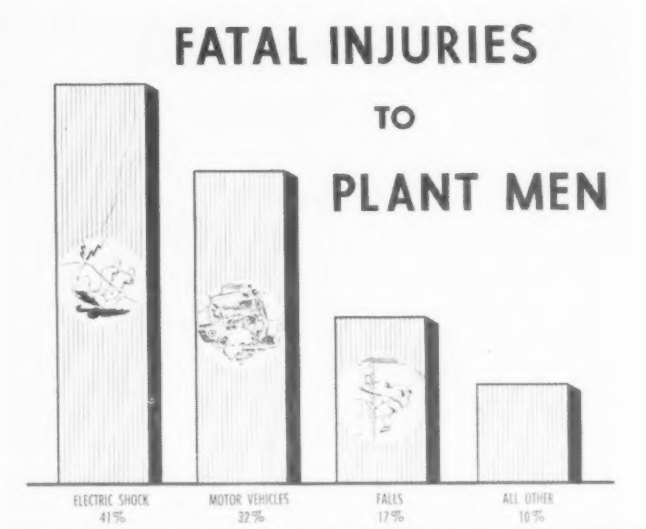
Where does the praise belong? It belongs to the entire industry—to the suppliers who work so diligently to make our tools and materials the best for every job. It belongs to the engineers and supervisors who plan, teach, and follow up ideas that help to make every job a safer job. It belongs, too, to the lineman in Laddonia, Mo., the installer in Portland, Ore., and to every other telephone craftsman who practices safety all day, every day, on every job.

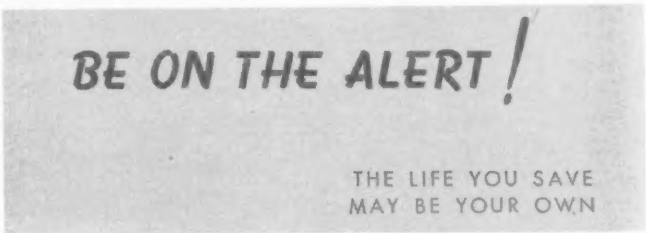
FACT NO. 2. Here is the challenge. . . . Telephone men still are getting killed doing the safest job in our country today. In addition to the fatal accidents, many are being hurt, and a great many accidents are occurring in which, fortunately, no one is injured.

Yes, today in one hand we hold a scroll of praises for a job well done, and with the other hand we are laying down a challenge to urge on, to inspire, and to rekindle the spirit in those who are working for the perfect safety record.

How are these men getting killed?

Forty-one per cent die a sudden death by electric shock. Any job of building a new line or repairing storm damage is just an ordinary job, until something goes wrong, or someone forgets. Then, the job becomes headline news. Rubber gloves may be left on the truck, or a wire reel





isn't tended properly, with the result that the wire tangles, flips up—there's a flash and a man is killed, or crippled for life.

You know the answer—know the job. Make use of what you know and give the new man on the job the benefit of your training and experience.

Thirty-two per cent of the plant men who were killed or injured were in motor vehicle accidents. Pick up your favorite newspaper—turn a few pages, and you'll find a typical story of how a car left the highway at a bend in the road. Perhaps the driver was—

(1) Driving too fast for the road conditions.

(2) Attempting to pass when he should have remained behind.

(3) Falling asleep.

(4) Unable to see the curve.

These same things happen to telephone men driving telephone cars and trucks.

Seventeen per cent were killed by falls. Many things make pole climbing a safe job—

(1) Good equipment in good condition.

(2) Proper tests of pole before climbing.

(3) Correct use of climbing spurs.

(4) Checking to see that the snap is engaged in the D ring.

Some of these falls are from ladders. Maybe the ladder wasn't lashed to a strand, or maybe a safety strap wasn't

used. Perhaps the ladder slipped or tipped because it wasn't set up properly. Maybe someone leaned out too far instead of moving the ladder.

Good telephone workmen were killed in other ways, too—10 per cent to be exact. What other ways? An inadequately shored trench caved in and two men were crushed and suffocated. A hammer slipped from the hands of a lineman on a pole, with a resultant skull fracture for the new lineman working at the base of the pole. He shouldn't have been there, but he didn't know.

In the face of the telephone industry's proud record of safety, the facts about fatal injuries to plant men are challenging, sobering facts. There is still a big, important safety job to do. The job is so big that we must all lend our thoughts, ideas, and inspirations to achieve the greatest good.

To help in some small measure in doing this job, TELEPHONY has pioneered the use of the slogan "YOU HAVE TIME FOR SAFETY." In response to our efforts many telephone companies and associations have adopted this slogan and the far-reaching meanings that lie behind it. Today we are pleased to offer this slogan to the entire industry—to every telephone operating company, large or small, Independent or otherwise; to the manufacturers and suppliers, and to every publication in the industry. We believe the greatest good can be achieved by the skilled cooperation of everyone in the industry.

For you, personally, wherever you are and whatever you are doing, remember—YOU HAVE TIME FOR SAFETY.

Bell Installs One Telephone Every Four Seconds in 1952

Bell telephone companies added one new telephone every four seconds during each working day of 1952, the American Telephone & Telegraph Company reported on Jan. 2.

Cleo F. Craig, president of the company, said "use of the telephone continues to increase and the Bell System companies look ahead to another very busy year. To meet public demands and improve service further, all the companies are keeping on with heavy construction programs.

"As our physical facilities grow," he added, "we are continually putting more new devices and equipments to work in the over-all telephone system. This is being done in accordance with long-range plans which, among other things, anticipate that ultimately telephone users will be able to dial their own long distance calls."

At the end of the year there were about 39,350,000 Bell System telephones in service, and people throughout the country were using them at the rate of 149 million conversations a day.

During 1952, the company conducted a trial of customer long distance dialing in Englewood, N. J. Subscribers there have been able to dial directly to 11 million telephones in and around a dozen large cities from coast to coast. Results of the trial indicate the service is practical and fast.

Eight out of 10 Bell System telephones were dial operated, as the year ended, and four out of 10 long distance calls were being dialed by the originating operator directly to the called telephone.

New major long distance switching centers were placed in operation in Omaha, Houston and Cincinnati. There are now 18 of these centers which, interconnected with other smaller systems, enable operators to dial through to distant telephones in 1,625 cities and towns.

About 3,100 miles of coaxial cable and radio relay routes were installed. Altogether 16,300 route miles of these facilities provide thousands of long distance telephone circuits as well as 31,500 channel miles for the transmission of network television and theatre television programs over the nationwide system. Coaxial cable and radio relay extensions brought 14 more cities into the national television network.

The companies went forward with new construction for which expenditures totaled approximately 1¼ billion dollars. They added more than 1,900,000 telephones, installed 2,000,000 miles of long distance circuits and cleared 850,000 requests for changes in service, to a line with fewer customers or to an individual line. In rural areas about a quarter of a million telephones were added, about half of them on lines with more than four parties, and progress continued in furnishing the kind of service where it is only necessary to lift the receiver to get the operator or dial tone. At the year's end about 94 per cent of rural telephones were this type.

Among the many technical developments of the year, was a new coaxial cable system with triple the capacity of those now in use. Designed by the Bell Telephone Laboratories, the "L-3" carrier will enable one pair of coaxial pipes to handle simultaneously more than 1,800 telephone conversations or 600 telephone conversations plus one television program in each direction.

Another laboratories invention, the transistor, was put to work during 1952 in the switching apparatus at Englewood. The transistor is a tiny electronic device which can do many of the things vacuum tubes can do and some things better. Licenses to manufacture transistors under Bell System patents were made available to 37 other companies by agreement with the Western Electric Company, whose own output has been mostly for military use.

Mr. Craig emphasized that "the telephone needs of the military and of defense industry will continue to get the promptest possible attention. The people of the Bell System," he said, "are deeply conscious that nothing is so important as the country's defense, and nothing is more important to defense than good communications."

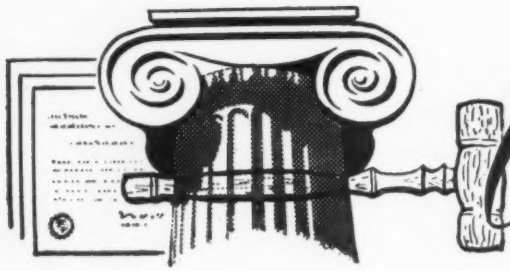
Plans were completed for the maintenance of essential telephone service in the event of emergency. Aircraft warning systems were set up for civil defense and air force filter centers. The Bell Telephone Laboratories and the Western Electric Co. designed and produced top secret electronic devices as well as guided missiles, fire control equipment for anti-aircraft guns, radar, atomic weapons, and a new field telephone for the Signal Corps. Assistance was also given the Signal Corps in the construction of vital long distance communications linking strategic areas in Alaska. For the millions of young Americans in uniform, more telephone facilities were made available in convenient, comfortable locations at their training camps and stations.

The number of Bell System employes, including the laboratories and Western Electric, reached nearly 700,000. And not only were more people than ever employed in the business, there were more people than ever owning it. AT&T shareowners passed 1,200,000, a gain of about 125,000 for the year.

"The tremendous rises in costs since the war are keeping the telephone companies under the necessity of obtaining increases in rates," Mr. Craig concluded. "This is essential to their being able to provide the kind and amount of service people need and want in the communities where they operate."

V V

"Excessive military expenditures have ended in despotism of monarchical, fascist, or socialist form. It is strange indeed that a group of men opposed to socialism and charged with the defense of their country should, in creating that defense, threaten us with socialism here at home."—ROBERT W. JOHNSON, *chairman of the board, Johnson & Johnson.*



Courts and Commissions

FCC Examiner O.K.'s Bell Purchase Of 8 "Detchon" Companies

A Federal Communications Commission hearing examiner on Dec. 31, gave tentative approval to purchase by Indiana Bell Telephone Company of 23 exchanges owned by eight companies in the John T. Detchon estate, throughout Indiana (TELEPHONY, Dec. 20, 1952, p. 27).

Examiner H. Gifford Irion, making his first decision as an FCC official, found that purchase by Bell of the smaller exchanges would be in the public interest. The decision is subject to review by the full commission, but probably will stand. There was no opposition to the sale.

The Indiana Bell company proposed to buy the company stock of the eight companies, all of which are part of the "east half" of the Detchon estate. Purchase price is to be $1,099,077. The purchase will add some 11,500 telephones to the present Indiana Bell system.

Communities involved in the transaction are: Brownsburg, Sheridan, Converse, Daleville and Middletown, Sims, Zionville, Amboy, Andrews, Bakers Corner, Carmel, Center, Greenfield, Ekin, Greentown, Kirklin, Lagro, Matthews, Mooresville, Morgantown, Nashville, Summitville, Upland and Noblesville.

V V

Wis. Commission Refuses To Act in Wage Issues

Chairman John C. Doerfer of the Wisconsin Public Service Commission announced on Dec. 26 that his agency will not consider pending wage negotiations in conjunction with rate cases.

He said public utilities and transportation companies had been advised of the commission policy in a letter commenting on an editorial in the Green Bay *Press-Gazette*. The editorial had stated that a recent bus strike at Racine might have been avoided if it had been possible to resolve questions of wages and fares in a single decision.

Although agreeing that it would be desirable to settle both questions at one time, Mr. Doerfer said the commission could not do so. He said:

"It is our considered judgment that we should not receive evidence of a pending wage negotiation. That type of evidence is too speculative to form the basis of a reasonable rate structure . . . and it would make the commission a labor arbiter . . .

"If both management and labor know before hand what wage level the commission will approve, there remains no deterrent on the part of management or labor to hold the demands within the bounds of reason. In effect, management and labor would merely be passing the duty of bargaining to a regulatory commission. This the legislature has not empowered the commission to do. Neither has the commission the facilities nor the staff to settle wage disputes which have arisen or may arise in the 1,092 public utilities and 165 common carriers over which it has jurisdiction . . .

"We reserve the right to pass upon the reasonableness of any contract which ultimately affects rates. It is the only known way which affords the public some assurance that a completed wage contract and other expense items of utilities are the results of good faith bargaining and prudent management."

V V

Bond Issue for Improving Plant Authorized in New Jersey

New Jersey Department of Public Utilities on Dec. 29 authorized Warwick Valley Telephone Co. to issue to the Berkshire Life Insurance Co., Pittsfield, Mass., $275,000 of first mortgage bonds, bearing 4 per cent interest and maturing on Nov. 1, 1977.

The commission noted that the proceeds from the bond sale will be used to discharge presently outstanding short term notes aggregating $215,000, an amount used to make additions and improvements to telephone plant; and to provide an additional $60,000 for proposed additions and betterments to the company's plant.

V V

Minnesota Commission Approves Sales of Six Independents

Minnesota Railroad & Warehouse Commission authorized the following sales:

On Dec. 19: Murdock Kerkhoven Telephone Co. to Murdock Louriston Telephone Co.

On Dec. 30: Sauk Valley Telephone Co., Sauk Centre, to Kandota Rural Telephone Co.; and Beseman Township Telephone System, Lakeview Township Telephone System, Prairie Lake Township Telephone System and Village of Wright Telephone System, all sold to O. L. Johnson, individual purchaser.

V V

New York Independent Granted Loan, Stock Approval

Middleburg Telephone Co., which serves about 1,050 stations, on Dec. 10 was authorized by the New York Public Service Commission to raise $275,000 by bank loan and stock issue.

The company will issue 150 shares of common and 550 shares of preferred stock, all with a par value of $100 per share, and will borrow the remaining $205,000 from Chase National Bank of New York City.

Proceeds of the transaction will be used to pay some outstanding debts and for additional plant construction.

When construction is completed the firm will have changed to automatic operation through its entire territory.

V V

California Company Asks Stock Issue Approval

The California Water & Telephone Co., Monrovia, which was granted a $286,000 annual rate increase effective on Nov. 3 by order of the California Public Utilities Commission (TELEPHONY, Nov. 1, 1952, p. 28) is now asking that commission for approval of a stock issue.

As of Dec. 19, the company wants to sell 60,000 new shares of common stock to raise 1.7 million dollars for its treasury. It has announced that Blyth & Co., Inc., would underwrite the issue at $29 a share, and offer the stock for public sale.

V V

Seeks REA Loan Authorization

Illinois Commerce Commission was to have heard on Jan. 7 the application of Port Byron Telephone Co., for authority to borrow $172,000 from REA.

V V

Ark. Company Asks Rate Raise

The Quitman Telephone Co. recently asked the Arkansas Public Service Commission for an increase in rates.

Report Bell Toll Revenues Return Only 2.11% in N. C.

V. L. Choate, accounting director of the North Carolina Utilities Commission, reported at a hearing on Dec. 29-30 that the Southern Bell Telephone & Telegraph Co. had earned 6.56 per cent on its intrastate exchange service through the 12 months ending July 31, 1952, but that the company's return on intrastate toll service for the same period was only 2.11 per cent.

Testifying on an audit which the commission made in connection with Southern Bell's request for rate increases approximating 4 million dollars a year, Mr. Choate limited himself to facts and figures and volunteered no conclusions or recommendations. However, upon questioning by Assistant Attorney General Beverly Lake of North Carolina, who opposes the increase, his testimony in substance seemed to indicate that the company does not need to increase exchange rates but should be entitled to higher toll rates.

The commission, which has granted Southern Bell five rate increases since 1945, has ruled in its past orders that the company is entitled to a return of from 6.48 to 6.5 per cent.

The company contends that it must earn at least 7.25 per cent on its net investment, to attract new capital and provide satisfactory service.

During the hearing, Mr. Choate, whose testimony was available to both sides but who was called as an opposition witness, admitted that the figures submitted by the company proved accurate, but that he differed with the company on some methods and conclusions.

His testimony closed a hearing which began in October when the company presented its side on the rate raise request. The hearing was resumed before Christmas, when opponents of the request were heard, then recessed until after the holidays.

The commission took the matter under advisement and both sides have until Jan. 12 to file briefs summarizing their principal arguments.

V V

» It has been said that if you think you're going to be happy and prosperous by sitting back and letting the government take care of you, look at the American Indian!

V V

Total federal, state and local debt on June 30, 1951, exceeded national income for 1951 by almost 5 billion dollars, says the Tax Foundation, New York City.

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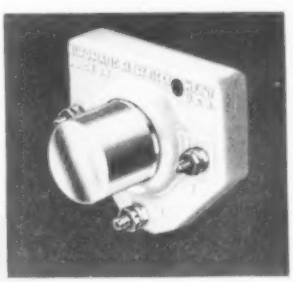
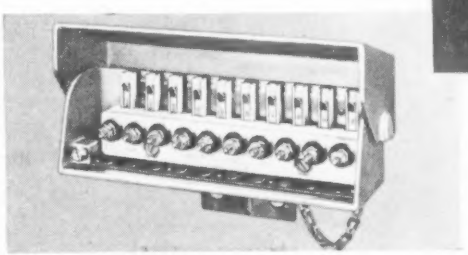
Heft it! Feel its *solid* construction. See the double-anchored cover that won't blow off, the vented fuses that can't explode on burnout. Note especially the *self-clearing* discharge blocks. They need no resetting, save maintenance, keep your lines in service. Order Cat. No. SB-91 (with cover), or SB-88 (without).

TYPE 16 SUBSTATION ARRESTER

Note its convenient compactness. See the self-clearing discharge blocks, the cap that keeps dust from grounding your lines. Order Cat. No. SA-57.





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THE PLANT MAN'S Notebook

by Ray Blain, Technical Editor

EARLY in December, metropolitan Washington, D. C., was changed over to two-letter five-digit telephone numbers. A total of 32 exchanges and over 300,000 lines were involved in this cut-over. Over 140,000 lines have previously been placed on the seven-digit system.

This changeover affects all emergency calls. To report a fire now, you must dial HObart 2-1616. The police emergency number is EXecutive 3-2060. The new FBI number is EXecutive 3-7100. To obtain an ambulance one must dial HObart 2-3322.

Even the United States Capitol has a new number, NAtional 8-3122. The White House remains NAtional 8-1414.

While admittedly necessary, these number changes always result in considerable confusion and a strain on public relations. Stationery, business cards, signs on trucks, etc., must be changed and this extra cost is usually resented by the average customer. It is believed that adequate publicity has not been given to the necessity for number changes to conform to the national toll dialing plan.

• • •

The writer was privileged to attend an interesting symposium on "Technical Progress in Communication Wire and Cables," sponsored by the Signal Corps Engineering Laboratories, Fort Monmouth, N. J. This meeting was held on Dec. 8, 9 and 10 at the Berkeley-Carteret Hotel, Asbury Park, N. J.

The technical session on the first day covered "Communication Theory and Systems." Subjects covered included radio relay systems, light weight tactical open wire systems; rural communication lines; crosstalk in cables; and cable transmission characteristics.

The second day covered "Wire and Cable Construction" and allied subjects, such as cable plugs and receptacles; wire connectors; shielding of coaxial cables; grounding of coaxial cables; drop wire manufacture; high speed braiding; development of spiral four cable and connector and inspection policies on quality control procedures.

The third and last day's session was on "Wire and Cable Materials." Subjects covered included arctic rubber development; fluorothene; polyvinyl chloride jackets; depolymerized rubber; stainless steel substitutes; water absorption of insulation; fungicides in insulation and moistureproofing of splices.

Manufacturers and sales representatives of the wire and cable industry attended and the registration was well over 400. Communication representatives of the Navy, Air Force and numerous railroads were also in attendance. The interest and attendance at all technical sessions were well above average. Practically every chair was occupied even at the close of the three-day session. Efforts are being initiated to make this an annual meeting as it is believed that it will prove beneficial to both manufacturing and operating engineers.

• • •

With the numerous recent improvements made in the compression and taper plug type connectors, this writer feels free to state that it would be possible at this time to install a complete telephone system without the use of soldered connections.

Furthermore, we are firm in the opinion that a telephone system of this type would not cause any more trouble—and perhaps less—than one in which all connections were soldered in the conventional manner.

It seems reasonable to assume that the soldered connection, which always requires much time if it is made properly, is due to fade out of the picture in the not-too-far-distant future.

• • •

The Blain family, less the dogs, recently drove the old jalopy from Washington to Scarsdale, N. Y., and return. Although this proved a very nice trip, we were somewhat surprised to learn that we were required to pay bridge and turnpike toll charges a total of 12 times at an over-all cost of $6.80. There is, however, no doubt that the use of the New Jersey Turnpike is certainly well worth the nominal toll charge. Being able to miss the Philadelphia and New York City traffic increases the pleasure of the trip considerably.

We noted, also, that the restaurants at the Service Centers are all provided with four telephone paystation booths. These booths are built into a circular wall in the lobby of the restaurants. Building booths into a wall gives them a neat and well-planned appearance.

• • •

A new anti-fog liquid for use on glass and plastic surfaces where fogging and steaming presents a problem has recently been placed on the market. This new liquid treats and cleans in one application. It will prove practical for correction glasses, industrial goggles, shields, masks and the inside of vehicle windshields.

This new liquid does not contain alcohol or glycerine. It does, however, contain silicones. Tests have proved its effectiveness and longer-lasting qualities.

It is packed in 4-ounce "squeeze-spray" plastic bottles which make it convenient to use and economical to buy.

A drop is all that is necessary on each spectacle lens. A quick spray may be used on larger surfaces. It may be quickly spread and wiped dry with a clean cloth or tissue.

• • •

Surveying about 5,000 high school students' leisure time doings, a New Jersey group found over 80 per cent spent 11.3 hours a week watching TV, and 9.2 hours on homework. Over half averaged 4.3 hours a week doing pleasure reading and 4.4 hours a week on the telephone.

• • •

It has been said that time, tide and television wait for no man.

Will all Telephone Subscribers want a PEATROPHONE?

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NO INDEED—no more than *all* subscribers use switchboards, multiple phones or intercommunication systems.

BUT—like these other services, Peatrophone mechanical telephone-answering service is a real necessity to many subscribers.

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REA LOANS $1,930,000 TO TELEPHONE COMPANIES IN EIGHT STATES

The Rural Electrification Administration approved eight telephone loans, totaling $1,930,000 from Dec. 15 to 26.

On Dec. 15, Sikes Telephone Co., Glenville, Ga., was allocated $3,000, a second loan to this borrower.

This supplemental loan compensates for a reduction in equity funds required from the borrower. This reduction was based on a revaluation of the applicant's present plant facilities since the original loan of $207,000 was approved in October, 1951.

The rehabilitation and expansion afforded under the two REA loans will bring dial telephone service to 854 subscribers over 143 miles of line in Tatnall County.

* * *

Haviland (Kan.) Telephone Co., on Dec. 15 received a $141,000 loan, to improve and expand rural telephone service in Kiowa and Pratt counties.

The Haviland company has been an individual proprietorship and recently incorporated. It furnishes magneto service to 290 subscribers over 92 miles of line and provides switching service for 20 stations on 20 miles of farmer-owned lines.

The loan funds will be used to acquire the Wellsford Telephone Exchange, serving 52 subscribers over 38 miles of line, build 110 miles of new line, convert the Haviland central office to dial operation and provide facilities to serve 48 subscribers now without telephones. The Haviland office will serve the Wellsford exchange area.

The completed system will furnish modern telephone service to 390 subscribers over 138 miles of line, and in addition furnish switching service to the 20 service stations.

* * *

Also on Dec. 15, South Central Utah Telephone Association, Richfield, Utah, received an allocation of $340,000 to improve and expand rural telephone service in Garfield, Kane, Piute, Sevier, Millard, Beaver, Wayne and Iron counties.

The newly-organized cooperative proposes to acquire the assets of the Escalante Telephone Co., which provides magneto service to 78 subscribers over 83 miles of line and switching service to 35 stations on farmer-owned lines.

With the REA loan funds the applicant plans to build 112 miles of new line, convert the present system to dial and install new dial central offices at Koosharem, Antimony, Tropic and Orderville. About 550 subscribers now without telephones will receive service as a result of the new construction.

According to present plans, service without toll charge will be available between the Escalante and Tropic exchange areas. Similar services between the Antimony and Koosharem areas will be arranged through the use of power line carrier facilities. Because it would be difficult and expensive to reach some of the subscribers in the Escalante exchange area with conventional telephone line, it is proposed to use radio-telephone equipment in some parts of this region.

When the new system is completed, 662 subscribers will receive modern dial service over 125 miles of line.

* * *

On Dec. 19, Smithville Telephone Co., Ellettsville, Ind., was allocated $336,000, to finance the improvement and expansion of telephone service in rural areas of Monroe County.

The company now provides magneto service to 110 rural subscribers over 12 miles of line. The loan funds will be used to acquire from the Monroe County Telephone Company at Ellettsville, the Clear Creek exchange, furnishing common battery and magneto service to 355 subscribers over 39 miles of line and build 88 miles of new line. The Clear Creek and Smithville exchange areas will be combined and one new automatic central office constructed near Smithville. The applicant is contemplating service without toll charge between the new central office and Bloomington, nearby trading center.

Completed, the system will consist of 119 miles of line providing modern telephone service to 1,311 rural subscribers, including 846 now without telephones.

* * *

Wiggins (Colo.) Telephone Association, received $64,000, second loan to this borrower. These loan funds will be used to cover the increase in construction costs since the first loan of $159,000 was approved in September, 1951.

As a result of the expansion and improvements possible under both REA loans, about 400 subscribers in Morgan and Weld counties will receive telephone service.

* * *

Egyptian Telephone Cooperative Association, Steeleville, Ill., was allocated $860,000 to finance the improvement and extension of rural service in Washington, Randolph, Perry and Jackson counties.

As a nucleus for its new system, the cooperative plans to acquire seven exchanges and other properties of telephone organizations now operating in the borrower's proposed operating area, totaling 254 miles of line serving 501 subscribers. The proposed acquisitions include: Oakdale Free Exchange Telephone Association; Stone Church Telephone Union; Elkton Exchange; Rice Farmers Mutual Telephone Co.; Baldwin Telephone Co.; New Palestine Mutual Telephone Co., and Schuline Mutual Telephone Co.

The new system will be entirely automatic with central offices at Rich, Baldwin, Lively Grove, Blair and Glenn. There will be no toll charge for calls between the Lively Grove and Rice exchange areas. The co-op will build 298 miles of new line to serve 1,575 additional rural subscribers.

When completed, the system will consist of 519 miles of line serving 2,076 subscribers.

* * *

Peninsula Telephone Co., Traverse City, Mich., received $51,000, the second loan to this borrower. These loan funds will be used to cover the increase in construction costs since the first loan was approved in March, 1951. The completed system, under revised plans to the borrower, will consist of 40 miles of line providing modern telephone service for 288 subscribers in Grand Traverse County.

* * *

South Plains Telephone Cooperative, Lubbock, Tex., obtained $135,000, second loan to this borrower. The applicant proposes to acquire from the West Texas Telephone Co. the telephone facilities serving 61 subscribers in Edmonson and the adjacent territory. This section, combined with a small portion of the area included in the first loan, will form a new exchange area of the South Plains system.

In order to integrate the acquired facilities with the

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Write today for full information on this money-saving sectional counter. Address Room 1648, Management Controls Reference Library, 315 Fourth Avenue, New York 10, N. Y.

Remington Rand INC

whole line the applicant plans to construct a new central office building at Edmonson, replace the automatic switchboard with a larger one, build 56 miles of new line, and rebuild 6 miles of the acquired line. There will be service without toll charge between the Edmonson and Halfway exchange areas of the South Plains Telephone Cooperative system. The expanded facilities, consisting of 113 miles of line, will provide modern telephone service to 157 rural families and establishments, including 61 acquired subscribers.

The 61 new subscribers are in addition to the approximately 2,500 ultimately to be served in Lubbock, Hale, Floyd and Crosby counties for whom facilities were provided in the first REA loan of $1,227,000 approved in March, 1951. On the basis of new engineering surveys, the system now being constructed with funds from the first loan will consist of about 1,000 miles of line and 11 automatic exchanges, instead of somewhat larger totals originally scheduled. The first of these exchanges was placed in service on Dec. 13.

REA 1952 Loans Almost Double Total of Two Previous Years

The rural telephone program of the Rural Electrification Administration (REA) in 1952 resulted in large-scale construction for the first time since it was authorized in October, 1949, the REA announced on Dec. 31.

REA in 1952 approved telephone loans almost equal in amount to the combined total for the two previous years of the program. Total approved loans were 54 million dollars at the end of 1951. They are now nearly 106 million dollars.

During 1952, many REA telephone borrowers completed the long period of sign-up of subscribers, engineering design, and construction, and placed into operation 18 of the 20 automatic systems now in service, REA stated. Since the middle of November, an average of more than one new REA-financed system per week has gone into service. Already, new REA-financed dial telephones are in service in more than one-fourth of the states—Virginia, Iowa, Minnesota, New York, North Carolina, Tennessee, South Carolina, Louisiana, Indiana, Georgia, Texas, West Virginia, and New Mexico. Texas and Iowa lead with three systems in service. The third cut-over (to dial service) in South Carolina is scheduled for the next few weeks. Other states are being added to the list rapidly, according to REA.

Funds actually have been advanced to about 100 telephone borrowers, totaling more than 17 million dollars. The first repayment due under the telephone program was made on schedule in September by a Virginia borrower, the Fredericksburg-Wilderness Telephone Co. at Chancellor.

Of the 20 REA-financed new telephone systems in service, two are owned by long-established non-profit companies, six by newly-formed farmer cooperatives, and the others by Independent commercial companies, most of which have been in business since the early years of this century.

A reorganization of the REA internal structure, effective July 1, reassigned a substantial number of people to devote full time to the rapidly expanding telephone work of the agency. The total REA staff was not increased, however. It numbered less than 1,150 at the end of 1952, compared with 1,154 at the beginning of the year.

Electrification progress was about the same during 1952 as during 1951. REA electrification loans, for example, totaled 182 million dollars in 1952 compared with 173 million dollars in 1951. There was a decline in miles of line newly placed in service, from 88,000 in 1951 to 63,000 in 1952; and in consumers added during the year, from 244,000 to 217,000. Most of the borrowers have found it necessary, however, to make system improvements (new substations, larger wires and larger individual transformers) in order to provide dependable service both now and for the future expansion they are committed to make, REA said.

Use of power continued to increase. The total amount of electricity handled by REA-financed power systems in 1952 was 13½ billion kilowatt-hours, an increase of more than two billion kwh over 1951. This was slightly greater than the 1951 increase over 1950. The total amount of revenues of the electric borrowers increased from 285 million dollars in 1951 to 325 million dollars in 1952.

Payments of principal and interest on the REA electrification loans reached a cumulative total of about 394 million dollars. Repayments of principal ahead of schedule increased by about 11 million dollars during the year, to 52 million dollars.

Payments overdue 30 days or more amounted to about one-fifth of 1 per cent of the amount due, the lowest ratio yet recorded, according to REA.

Foreign News

(From TELEPHONY's Pakistan correspondent, Kaskry.)

PAKISTAN: The scarcity of telephones in Karachi was the subject of a discussion in Parliament recently. The Communications Minister, Khan Sardar Bahadur Khan, reported that 694 applications for telephone installations in Karachi had been received during 1952, of which 82 applications had been filled. The minister added that efforts were being made to meet the demand for telephones, and equipment for 5,000 lines was now being installed; while equipment for 2,000 more lines was ordered.

* * *

A telephone exchange large enough to handle between 1,500 to 2,000 connections will shortly be installed at Lyallpur. This plan is believed to have been under consideration by the Posts & Telegraph Department for some time. This will, however, be a part of a larger scheme to provide telephone facilities at over 100 places in the Punjab besides augmenting those already in existence. There are at present only 360 telephones in Lyallpur, in contrast to about 150 to 175 in pre-partition days. Applications for about 1,700 new telephones are said to be under consideration with the telephone authorities. The telephone expansion plans provide for the establishment of exchanges at Chak, Jhumra, Chiniot and the Ahmadi headquarters, Rabwa.

Pakistan-Bermuda Agreement: Pakistan signed an amendment to the Bermuda Agreement in London recently; this agreement regulates traffic rates between the U.S.A., the United Kingdom, and the Commonwealth (British) countries. The amendment was necessitated mainly because of the devaluation of Commonwealth currencies, other than Pakistan.

Dacca will have 200 automatic and 1,000 regular telephones, in addition to the existing 1,200 telephones, by the middle of 1953. A sum of Rs 26 lakhs has been sanctioned for the automatic telephone exchange in Dacca. The construction of the building is nearing completion and the exchange is expected to begin functioning in June, 1953.

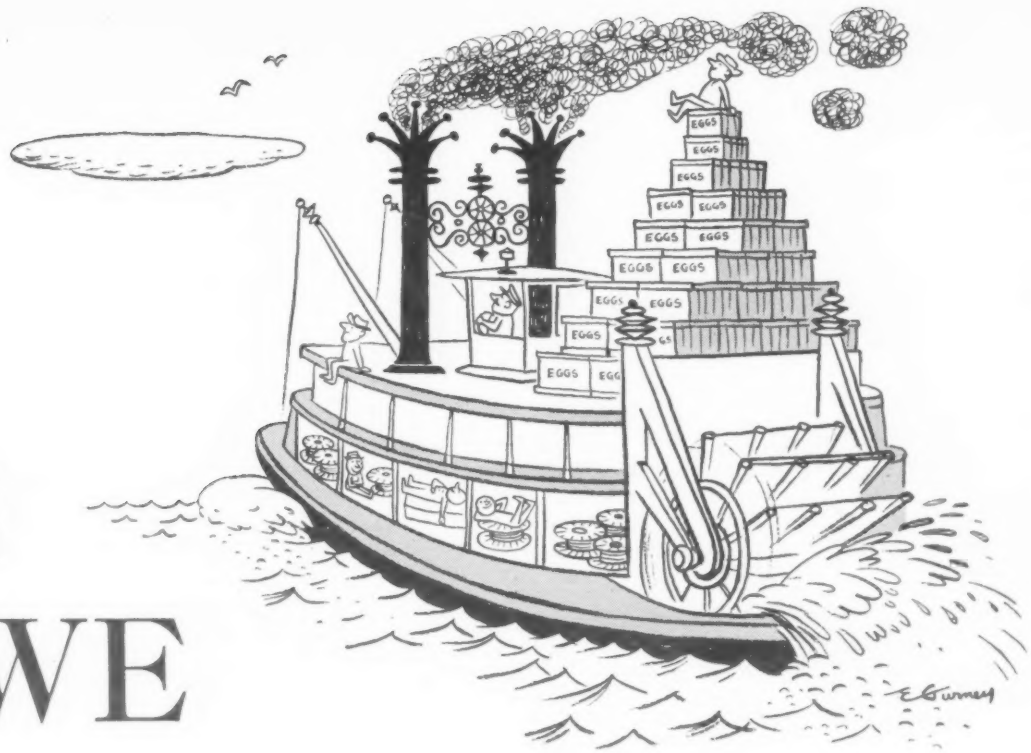
* * *

INDIA: A. K. Chanda, deputy minister of external affairs, told the House of the People that negotiations for the establishment of a direct wireless link between Persia and India are still in progress.

* * *

Tirupathi—the famous pilgrim center in the South—was linked by telephone with the rest of India when Dr. U. Krishna Rao, minister for industries, opened an automatic telephone

The Egg and WE



Recent Mid-Western floods reminded us at Western Electric of something that happened nearly 40 years ago; the great spring thaw of 1913 . . . and those eggs.

Marietta, Ohio and all approaches to it were deep under flood waters from the Ohio River. So was the terminal room of the local telephone building.

Western Electric chartered a stern wheel steamboat and a barge to float into Marietta a 65-man crew of installers, along with their tools, equipment, bedding . . . and *food*. That's how the eggs got aboard.

Intending to order 144 dozen eggs, the general foreman actually ordered 144 cases . . . or eggs-actly 66½ dozen eggs per man! The old stern wheeler practically cackled as it arrived in Marietta.

On the job, the crew removed damaged equipment from the telephone building as fast as the waters receded . . . but they couldn't make a dent in the eggs. To make matters worse the men polished off the ham and coffee within two days. For the rest of the job only canned beans remained . . . and EGGS. There were eggs for breakfast, lunch and dinner . . . fried eggs, boiled eggs, scrambled eggs.

But long before the eggs had disappeared this crew had finished its assignment. Working twelve hour shifts, in four days the men had 1200 lines, 60 trunks, 4 toll and 6 local positions and the power plant back in service.

MORAL: A long time ago, Western Electric acquired the habit of getting things done fast . . . come eggs or high water . . . and we're still at it on our two main jobs: one, helping to keep the Bell telephone companies going and growing and, two, together with our team-mate, Bell Telephone Laboratories, devising and producing what the Armed Forces need from us for defense.

Western Electric

A UNIT OF THE BELL SYSTEM

exchange there on Oct. 24. Dr. Rao congratulated the Tirumalai-Tirupathi Devasthanam for taking the initiative of installing the exchange "under your own telephone system." The development of telephone communications in the state, Dr. Rao said, could be accelerated only if the local people are prepared to advance the requisite funds to the department under this system.

* * *

A 500-line central battery manual telephone exchange was cut over in Patiala by P. K. Srinivasachari, postmaster general, Punjab Circle, India. Mr. Sengupta, director of telegraphs, said on this occasion that the entire switchboard of the new exchange was completely made in India. Patiala had its first telephone system in 1910 with a 100-line magneto exchange.

* * *

P. M. Agarwala, general manager of telephone communications in Bombay, said that the number of city calls had increased 300 per cent per day. In the Byculla and Naigaum exchanges, more than 10,000 lines have been installed, he said. He said Bombay has the largest telephone system in India and has developed into a center for trunk calls. While the total number of workers in the service is 2,500, more than 200 operators are needed to manage the trunk (toll) calls.

* * *

Five new telephone exchanges will be opened soon in Assam.

* * *

An automatic telephone exchange equipped for 50 lines connected to the general trunk (toll) system of the country was opened at Gudur (Madras).

* * *

To facilitate proper coordination and planning in the field of communications, and to safeguard the interests of radio communications, the government of India has set up a cabinet committee on telecommunications with the Minister of Communications as the chairman. The government has also set up a Radio and Cable Board in the Ministry of Communications to advise this cabinet committee. Besides the Communications Minister, the cabinet committee will consist of the Minister of Defense, Information and Broadcasting; the Deputy Minister for Natural Resources and Scientific Research, and any other minister concerned with the business coming up for discussion before the committee.

Among the functions of this board will be the insuring of better coordination in the field of communications, particularly wireless; reviewing the adequacy of both external and internal radio, cable and other communications systems, and guaranteeing their maximum efficient utilization.

* * *

Since Nov. 17, telegrams from Calcutta to London have been transmitted within five minutes. This service is a high speed tape relay system, for expedient disposition of all foreign telegraphic traffic. Under it, all overseas telegrams—whether handled at the telegraph offices in Calcutta, or received from other parts of West Bengal and from Assam, Bihar and Orissa—will be handled by the Posts & Telegraphs Department (P&TD) directly to the Overseas Communications Service's (OCS) operational office in Calcutta.

From here the OCS will transmit the telegrams on its own high speed equipment, utilizing for the time being, the Calcutta-Bombay land line facilities of the P&TD. Messages will be automatically transcribed on tapes by high speed perforators located in the operational offices of OCS's Bombay center, which is in direct contact with various foreign countries.

The service is the first step towards speeding up foreign telegraphic traffic. The installation of OCS radio transmitting and receiving stations in Calcutta, is already under way, fulfilling part of the Indian government's five year plan for expanding the facilities for telegraph, telephone and radio-photo communications between India and overseas countries.

V V

Average Citizen Owes $1,840 As Share of Public Debt

The average American owed $1.00 more in 1951 than he did in 1932, in terms of local debt per capita. But as a federal taxpayer he was $1,527 more in the hole in 1951 than in 1932, again on a per capita basis.

Unbelievers are referred to the seventh and latest edition of "Facts and Figures on Government Finance, 1952-53," issued by the Tax Foundation, 30 Rockefeller Plaza, New York 20, N. Y. The foundation, a private, non-profit research organization, publishes the reference work biennially for editors, public officials and the interested citizen.

Back in 1932, the per capita local debt was only $134. By 1951 it had risen only $1.00 to $135. However, indicative of the swift rise of federal spending, by 1951 the average man in the U. S. owed $1,840 as his share of all debt (Federal, state, and local), as against the $313 he "owed" back in 1932, the foundation reports.

The total debt of all government in the U. S. at the end of fiscal 1951 was 282 billion dollars—only about 3 billion dollars less than at the peak of World War II. The federal debt alone, 259 billion dollars, highest in any year since 1946, was the equivalent of about $1,650 for every man, woman and child in the nation. The interest on this debt, it is estimated, will amount to about $39 per person by the end of fiscal 1953, making it the highest in the nation's history.

V V

Marble Named Plant Engineer Of Rochester Company

G. W. Miller, chief engineer of the Rochester (N. Y.) Telephone Corp., has announced that Clarence Marble was promoted to the position of plant engineer on Jan. 1, succeeding John G. Carritt, who is retiring.

Mr. Marble, a native of Chicago, Ill., has been with the Rochester company for more than 32 years, his first job being a draftsman in the engineering department. After a series of promotions, he was appointed assistant plant engineer in July, 1950.

Mr. Marble is a veteran of the two World Wars. He was on active duty in the Navy during World War I and, in World War II, served in the Army. He was also a civilian engineer in the Signal Corps at Governor's Island and at the University of Kentucky.

He has been granted three patents in the telephone field.

V V

Quincy (Fla.) Company Starts New Building

The preliminary work has begun on the new central office building of the Quincy (Fla.) Telephone Co.

The new building is part of the two-year $425,000 dial conversion-plant expansion program set off by the company in December, 1951.

It was reported by Mrs. Allene M. Drew Cantey, president of the company, that "the building will cost $86,000."

Mrs. Cantey also stated that "other phases of the expansion program are proceeding on schedule. The delivery of materials and supplies for the program is as expected, and the preparation of the outside plant for dial conversion is being stepped up. It is presently expected that the company's system will be converted to dial operation by the end of 1953."

V V

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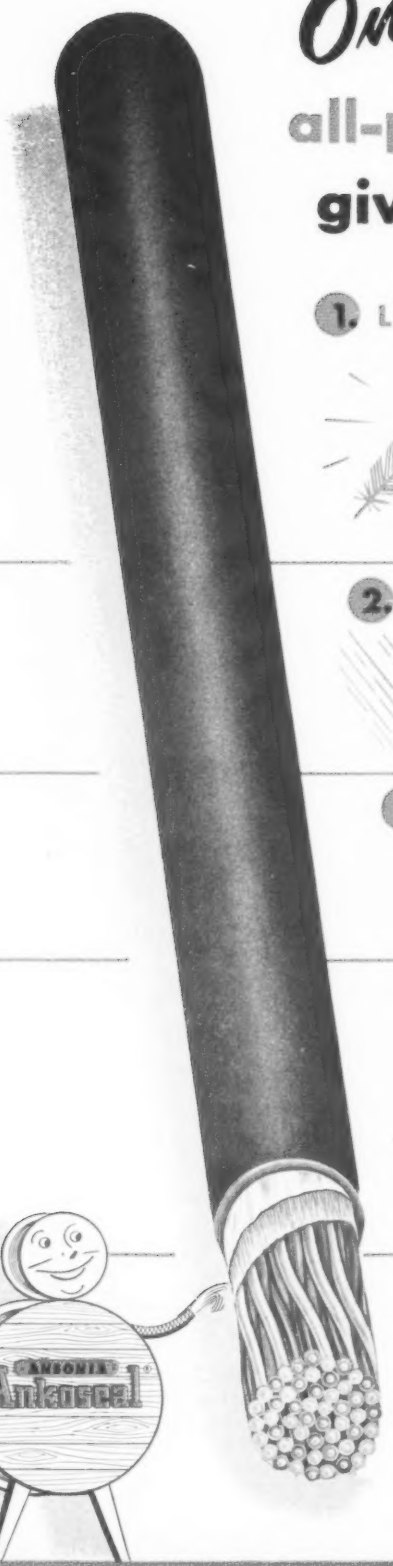

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Capacitance of Ankoseal #22 AWG .075 mfd mile

Transmission losses per mile (terminated in characteristic impedance 1000 cps)

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Locating Faults with Bridge and Ohmmeter

(Concluded from page 16)

Of course, there are cable troubles that cannot be located by any bridge method, generally because of excessive resistance of the faults; however, such faults usually do not completely interrupt service.

Line Trouble Location

We have attempted to stress the value of the Ohmmeter as it applies to cable fault analysis.

The same type of instrument is equally valuable for making tests of many descriptions on the line as well, and we shall attempt to suggest some of the most important uses in connection with line testing.

In the small plant, especially where, in many cases, there is no regular testboard provided and the trouble man must take the trouble from the switchboard out, many trouble shooters thoroughly familiar with their lines are able, from a simple test with the Ohmmeter, to estimate with reasonable accuracy the distance from the central office to the short, ground or cross.

Good trouble shooters on small systems usually keep personal records of the resistance to several points along the line when the conditions are normal. When faults occur, they can then compare present tests with those made when the line conditions were normal, which will, in many instances, indicate what the trouble is and approximately where it lies. Because no calculations are required, there is no reason why every trouble man cannot make profitable use of an Ohmmeter.

It is important that any meter selected should have a large scale, graduated so that low resistances may be measured with reasonable accuracy.

For example, *Fig. 5* shows a meter that can be adapted for many uses about the telephone plant, the scale of which is in .2-ohm graduations in the low part of the scale. This type of meter is ideal for locating bad line wire splices, loose test connectors, checking the approximate distance from the central office to the fault, etc.

Station Equipment Testing

The Ohmmeter is in a class by itself for checking loop to line wire connections, station protectors, inside wire, and station equipment.

Station or cable terminal fuses can be tested quickly and much more accurately with the Ohmmeter. If for any reason a loose connection develops where the first wire is soldered to the end terminal of the fuse, by connecting the meter test leads one to each end of the fuse then tapping the fuse, the meter will indicate whether or not the fuse is defective.

To check the protector discharge blocks, connect the meter leads across the discharge blocks, first one pair, then the other, and when grounded the meter will indicate a short.

The inside wiring also may be quickly checked with the Ohmmeter.

There is no part of a telephone that cannot be tested with sufficient accuracy to show exactly where the fault lies regardless of type instrument—magneto, common battery or dial.

The following is a list of tests that can be made on telephone parts:

(1) Testing ringers for correct resistance shorts or opens.

(2) Testing condensers for partial or solid shorts.

(3) Checking receivers for opens.

(4) Measuring transmitter resistance and checking for variations produced by sound.

(5) Measuring the primary and secondary induction coil resistance for partial or solid shorts, crosses, between windings and opens.

(6) Observing dial impulse spring action; also other dial contacts.

(7) Testing receiver and line cords for cut-outs or opens.

(8) On magneto telephones checking the current output of the dry cells (we assume that you have a multimeter which includes an ammeter).

Although it is not included in the title of this paper, we cannot refrain from making several comments as to the value of a good Ohmmeter for testing resistances in the central office.

Coils of every description may be checked for opens, partial opens, shorts, partial shorts, crossed windings, etc.

We are assuming that the type of meter available is graduated, or similar to the one illustrated in *Fig. 5*, with which resistances as low as two-tenths of an ohm can be read with reasonable accuracy and the top limit of its range is in megohms.

Those purchasing an Ohmmeter would be well advised not to purchase a type where the first graduation mark on the scale may be one-fourth inch, or less, away from zero and indicate 25 ohms.

The applications of the Wheatstone Bridge, also the Ohmmeter in every part of the telephone plant are far too numerous to be included in this paper. However, we hope to have made comments and suggestions which will be of some benefit to plant personnel.

V V

It has been said that modern man applies mass production to everything including mistakes.

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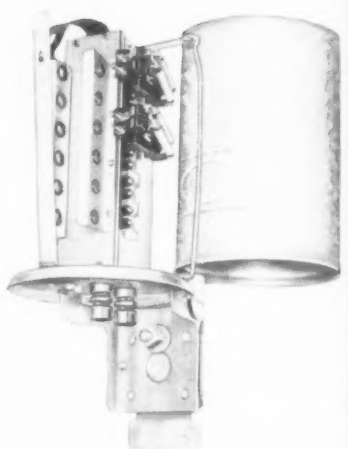
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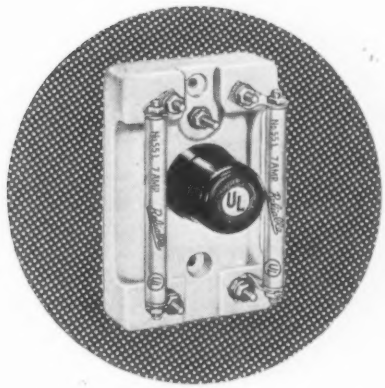

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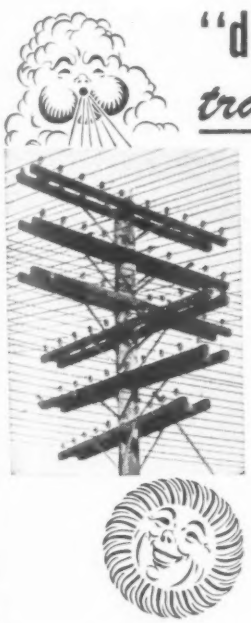

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In the Nation's Capital

(Concluded from page 18)

involved in the controversy which led to the formation of an advisory committee by President-elect Eisenhower to reorganize agriculture. But everyone knows that once reorganization gets underway, nobody can tell where it will end or where the various bureaus or sub-bureaus will find themselves when it is all over. The chances are that REA—protected by special congressional legislation of its own, going back to 1935 when it was an independent agency—will probably remain fairly intact. But then again, nobody knows.

There is plenty of scrapping going on already, within agriculture, between the Soil Conservation Service and the powerful Production and Marketing Administration which wants to "eat up" the former under a so-called "coordination" program. The merger of these two bureaus has already been put into effect. And the chances are that the Eisenhower advisory committee will not change the merger since it promises certain efficiency and economy. But it shows what can happen to well-established agencies, within the same department, when a reorganization program tears loose.

V V

H. E. Clapham Cited by Fellow Employes

H. E. Clapham, director of publicity for Automatic Electric Co., and affiliated companies, was honored on Dec. 11, 1952, when he was presented the Talbot G. Martin Award of the Strowger Automatic Club, Automatic Electric employes organization.

The award, named after the late T. G. Martin, for many years chief engineer of Automatic Electric, has been presented each year since 1934 to the member who is judged to have made notable contributions to the art of communications.

Symbolized by a bronze plaque, suitably inscribed, the award was presented at the December meeting of the club by L. L. Ruggles, chief sales engineer, whose association with Mr. Clapham dates from early 1919 when they attended the same session of the Automatic Electric Training School.

In his presentation address, Mr. Ruggles reviewed the 35-year period during which Mr. Clapham has served Automatic Electric in various capacities, and particularly in the fields of advertising, technical writing and public relations. Mr. Ruggles closed by

HERBERT E. CLAPHAM of Automatic Electric Sales Corp., receiving the Talbot G. Martin award of the Strowger Automatic Club from L. L. RUGGLES, chief sales engineer of Automatic.

reading the following citation which appears on the plaque: "To Herbert E. Clapham, whose gifted mind and pen, devoted for many years to the promotion of Strowger Automatic equipment, have contributed immeasurably to its widespread use."

Mr. Clapham responded briefly, expressing his thanks to the club, and relating the circumstances which led to his entry into the field of publicity and advertising. He closed with a plea for the greatest possible help to the younger people in the organization who need the guidance which is born of long experience, and who must some day be prepared to assist in the administration of a business which is steadily growing in scope and complexity.

The meeting was attended by some 260, including a number of Mr. Clapham's friends in the publishing and graphic arts fields. Guests of honor included a number of former Martin Award winners.

Answers to Traffic Questions On Page 23

(1) The routing directions should be entered unless you are sure they are not correct.

(2) Yes.

(3) Say, "Will you please place your call from (other number) when you are ready to talk?" and scratch the ticket if written.

(4) Say for example, "I'll try to remind you, but I may be busy on another call." Enter "Nfy (stated period)."

(5) Enter the filing time as an overlap operation if you proceed immediately with the attempt, or before sending the ticket to the delayed position if you release the calling party without making an attempt to complete the call.

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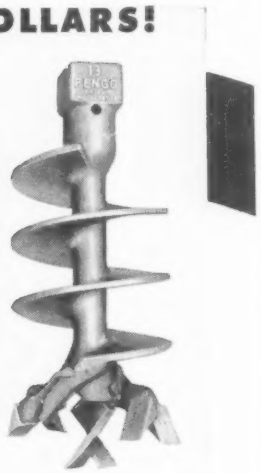

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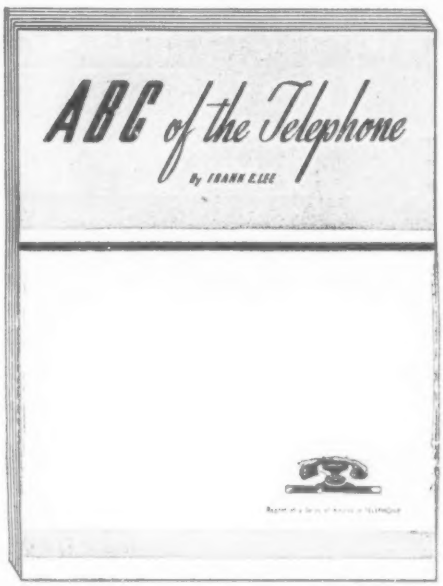

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Hubbard and Co. Elects New Officials

At a recent meeting of the board of directors of Hubbard & Co., Joseph V. Smith was elected chairman of the

J. V. SMITH

board and chairman of the executive committee and James H. Knowles was elected president, effective Jan. 1.

Mr. Smith has been with Hubbard & Co. since 1915 and Mr. Knowles since 1947.

Hubbard operates plants at Chicago, Ill.; Oakland, Cal.; Alton, Ill.; Hunt-

J. H. KNOWLES

ington, W. Va.; and Clinton, Ind. The parent plant and company headquarters are at Pittsburgh, Pa.

V V

Leddy Named Kellogg's Assistant Vice President

Thomas P. Leddy, former vice president and general manager, Federal Electric Mfg. Co., Montreal, Canada, has been elected assistant vice president of Kellogg Switchboard & Supply Co., Chicago, Ill., an International Telephone & Telegraph Corp. associate.

T. P. LEDDY

Assigned to the staff of Vice President and Sales Manager F. M. Parsons, Mr. Leddy will coordinate activities of the Kellogg company's government sales department, President James H. Kellogg announced.

Federal Electric Mfg. Co. is a wholly-owned subsidiary of Federal Telephone & Radio Corp., Clifton, N. J., also an IT&T associate. Previous to serving as the Montreal company's vice president and general manager of Federal Electric Mfg. Co., Mr. Leddy was manager of Federal Telephone & Radio Corp.'s terminated government contracts division.

V V

G. F. DeCoursin Appointed FWD Sales Manager

G. F. DeCoursin has been appointed to the position of general sales manager of The Four Wheel Drive Auto Co., Clintonville, Wis., it was announced recently by Robert A. Olen, president and general manager of the company.

Mr. DeCoursin went with FWD in 1936, starting in the factory. He was rapidly promoted from one position to another, involving purchasing, production and application of FWD trucks.

In 1945, he was made manager of the standards department, but his interests also included sales and business problems. At the University of Wisconsin and the University of Iowa, which he attended on leave of absence, he concentrated on business and sales management.

He was promoted to the sales department early in 1949 and in 1950 became field sales manager in charge of all the sales activities of FWD dealers and salesmen. He soon became well known throughout the organization for his un-

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V V

Fourteen Engineers, Three Students, Receive AIEE Honors

The Committee on Award of Institute Prizes of the American Institute of Electrical Engineers has announced technical paper awards in four divisions, H. H. Henline, secretary, announced on Jan. 8. The awards, to 14 electrical engineers and three students, will be presented at the winter general meeting of the institute in New York City on Jan. 19, during the opening session of the five-day conclave.

The awards were reported by the committee, headed by E. I. Green, of the Bell Telephone Laboratories.

Technical papers selected for first and second prize in the communications division were: First prize: J. J. Pilloid, American Telephone & Telegraph Co., "Fundamental Plans for Toll Telephone Plant"; second prize: F. F. Shipley, Bell Telephone Laboratories, "Automatic Toll Switching Systems."

V V

If enough dollar bills to equal federal budget expenditures in fiscal 1952 were used as wallpaper, says the Tax Foundation, New York City, they would provide enough paper for 10½ million large living rooms.

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